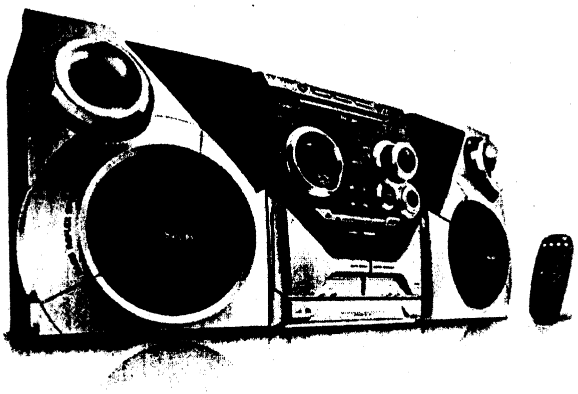
**Mini System** **FWM35/21/21M/22/30**

Service
Service
**Service**



# Service Manual

COMPACT disc DIGITAL AUDIO ReWritable
COMPACT disc DIGITAL AUDIO Recordable
COMPACT disc DIGITAL AUDIO
MP3-CD PLAYBACK MP3

## TABLE OF CONTENTS

Page
Location of PC Boards ........ 1-2
Versions Variation & Package ........ 1-2
Specifications ........ 1-3
Measurement Setup ........ 1-4
Service Aids ........ 1-5
ESD & Safety Instruction ........ 1-6
Service Instruction ........ 1-7
Setting Procedure & Repair Instructions ........ 2
Disassembly Instructions & Service positions ........ 3
Block & Wiring Diagram ........ 4
Front Board ........ 5
Main Board ........ 6
ETF7 Tape Module ........ 7
Power Board ........ 8
3CDC-LC-MP3CD2002 Module ........ 9
Mechanical Exploded View & Parts List ........ 10

CLASS 1
LASER PRODUCT

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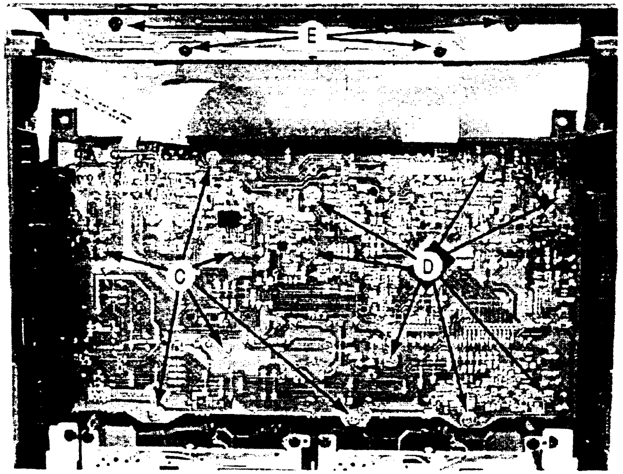
GB 3141 785 30140

**Version 1.0**

**PHILIPS**

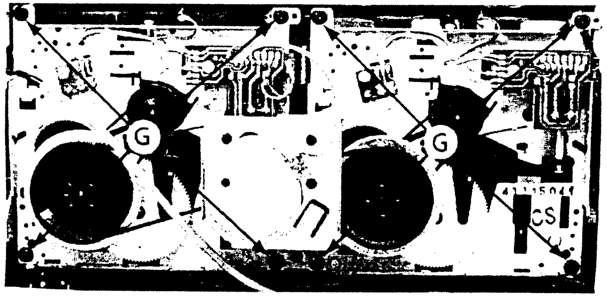
***Dismantling of the Front Board***

1) Remove 6 screws C and 7 screws D as indicated to loosen the Front Board.
2) Remove 4 screws E as indicated to loosen the Front Board.



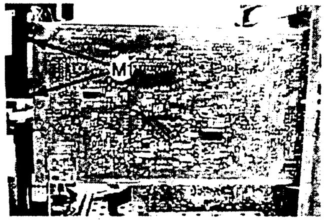
***Dismantling of the ETF Tape Module***

1) Remove 8 screws G as indicated to loosen the ETF Tape Module.

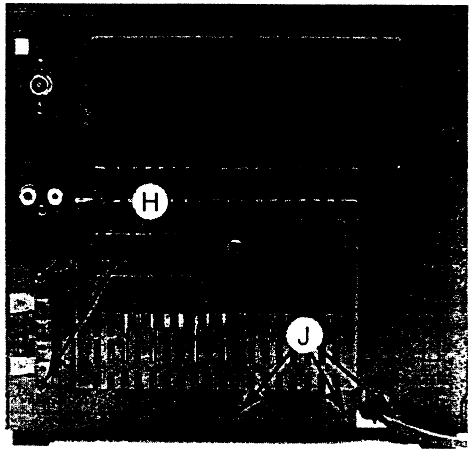


***Dismantling of Rear Portion***

1) Remove 5 screws H and uncatch M1 as indicated to loosen the Main Board.
2) Remove 3 screws J as indicated to loosen the Panel Rear.



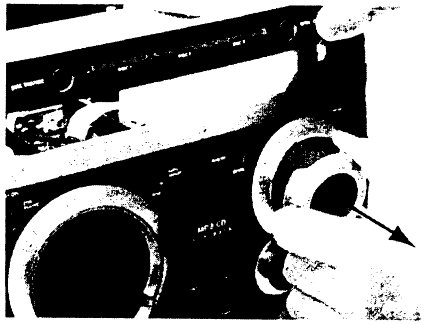
Remove Main Board



***Repair Hints***

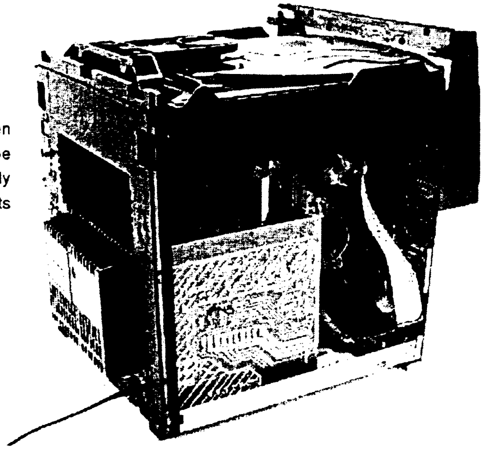
1) The Knob Volume can be remove pull it out in the direction as indicated. See picture 1.

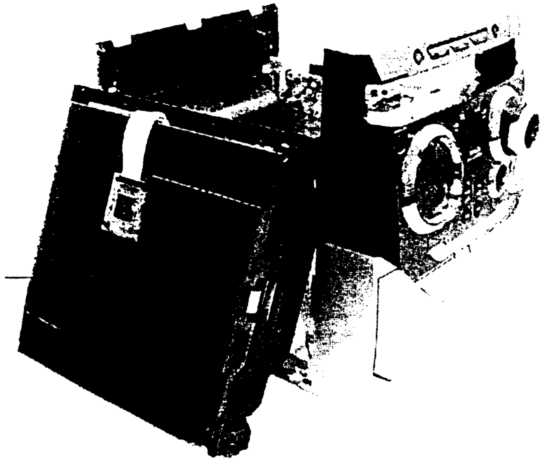
Picture 1

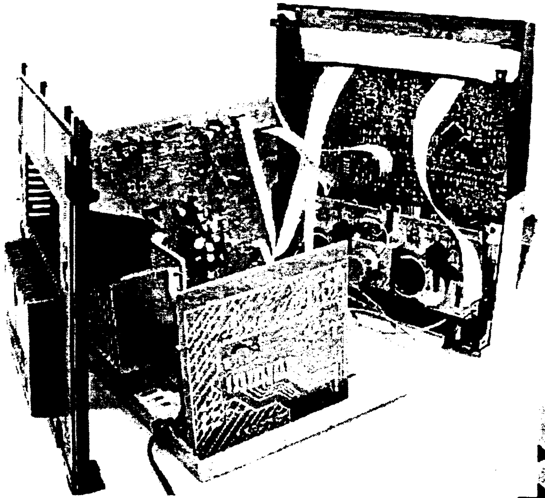


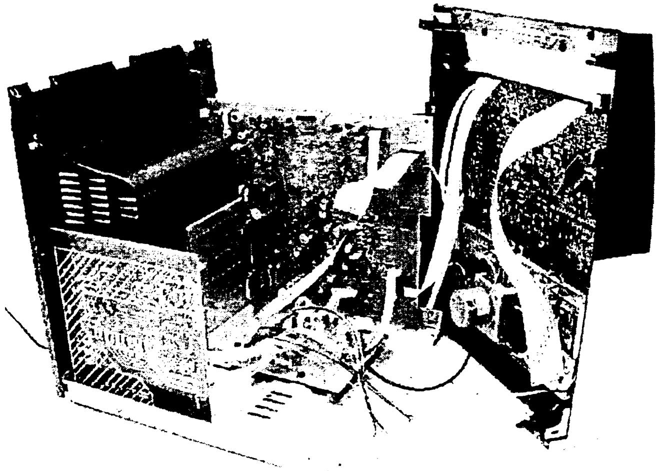
3) During repair it is possible to disconnect the Tape board and CDC Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.

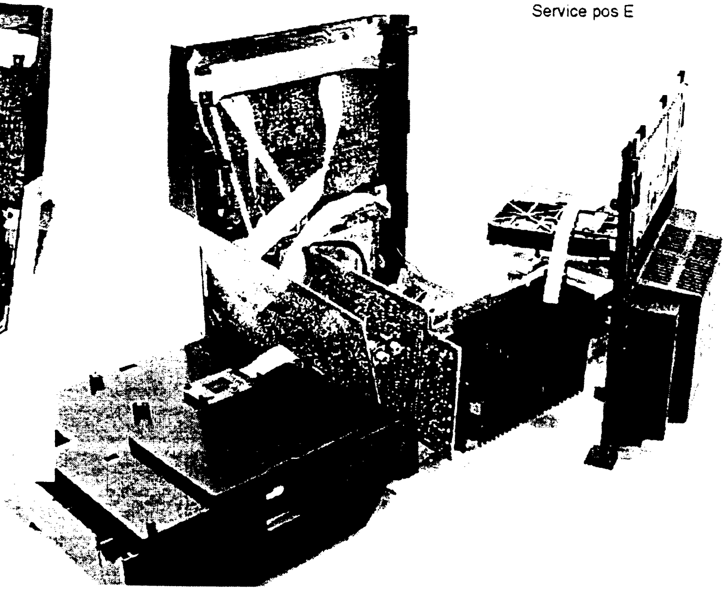
Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occurs.


Service pos A

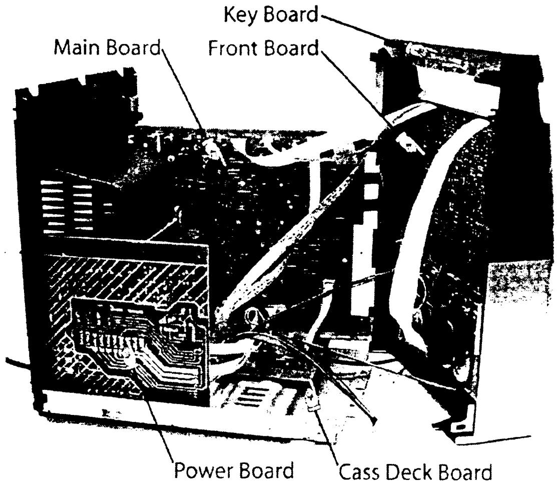

Service pos B


Service pos D


Service pos C


Service pos E

# LOCATION OF PCBS



**VERSION VARIATIONS:**

| Type /Versions:<br>Features & Board in used: | FWM35 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | /21 | /21M | /22 | /30 | | | | |
| Karaoke | | | | | | | | |
| News | | | x | | | | | |
| RDS | | | x | | | | | |
| Rotary Encoder (volume control) | x | x | x | x | | | | |
| Jog Shuttle | | | | | | | | |
| Voltage Selector | x | x | | | | | | |
| Aux Input | x | x | x | x | | | | |
| Digital Output | | | | | | | | |
| Headphone Socket | x | x | x | x | | | | |
| Line Output | | | | | | | | |
| Matrix Surround Loudspeakers | | | | | | | | |
| Standby - FTD Clock Display | x | x | x | x | | | | |
| ECO Standby - Dark | | | x | | | | | |
| ECO6 Tuner board - System Non-Cenelec | x | x | | x | | | | |
| ECO6 Tuner board - System Cenelec | | | x | | | | | |
| ETF7 Tape Module: Non-Autoreverse Ferro | x | x | x | x | | | | |
| POWER 2001 Module (30-70W Version): | x | x | x | x | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

---

## SPECIFICATIONS

### GENERAL:

| | |
|---|---|
| Mains voltage | : 110-127V/220-240V Switchable for /21/21M<br>230V ± 10% for /22/30 |
| Mains frequency | : 50/60Hz |
| Power consumption | : < 1W at ECO Standby /22/25<br>< 15W Standby w/Clock on<br>< 30W Active |
| Clock accuracy | : < 4 seconds per day |
| Dimension centre unit | : 265 x 310 x 367mm |

### TUNER:

**FM**

| | |
|---|---|
| Tuning range | : 87.5-108MHz |
| Grid | : 50kHz |
| IF frequency | : 10.7MHz ± 20kHz |
| Aerial input | : 75Ω coaxial |
| Sensitivity at 26dB S/N | : < 7μV |
| Selectivity at 600kHz bandwidth | : > 25dB |
| IF rejection | : > 60dB [80dB] |
| Image rejection | : > 25dB [75dB] |
| Distortion at RF=1mV, dev. 75kHz | : < 3% |
| -3dB Limiting point | : < 8μV |
| Crosstalk at RF=1mV, dev. 40kHz | : > 18dB |

**MW**

| | |
|---|---|
| Tuning range | : 531-1602kHz<br>530-1700kHz for /21 |
| Grid | : 9kHz<br>10kHz for /21 |
| IF frequency | : 450kHz ± 1kHz |
| Aerial input | : Frame aerial |
| Sensitivity at 26dB S/N | : < 4.4mV/M[4.0mv/m] |
| Selectivity at 18kHz bandwidth | : > 18dB |
| IF rejection | : > 45dB |
| Image rejection | : > 28dB |
| Distortion at RF=50mV, m=80% | : < 5% |

### AMPLIFIER:

| | |
|---|---|
| Output power (6Ω, 1 kHz, 10% THD) | : 2 x 40W RMS |
| Frequency response within -3dB | : 50Hz-15kHz |
| Dynamic Bass Boost | : DBB OFF, DBB 1, DBB 2, DBB 3 2) |
| Digital Sound Control | : Jazz, Rock, Techno, Optimal 2) |
| Headphone output at 32Ω | : 15mW ± 2dB<br>5mW ± 2dB (CD mode) |
| Input sensitivity | |
| Aux / CDR | : 500mV / 1.0V at 600Ω |

### CASSETTE RECORDER:

| | |
|---|---|
| Number of track | : 2 x 2 stereo |
| Tape speed | : 4.76 cm/sec ± 2% |
| Wow and flutter | : < 0.4% DIN |
| Fast-wind/rewind time C60 | : 130 sec |
| Bias system | : 75kHz ± 10kHz |
| Rec/Pb frequency response within 8dB | : 80Hz - 12.5kHz |
| Signal to noise ratio Type | : > 48dBA |

### COMPACT DISC:

Measurement done at output conn. of the CDC module.

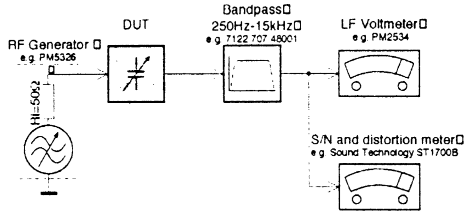
| | |
|---|---|
| Frequency response within ± 1.5dB | : 20Hz - 20kHz |
| Output level (in Vrms) | : 550mV ±1dB, $R_{out}$ = 100Ω |
| Signal/Noise ratio (A-weighted) | : > 86dBA |
| Distortion at 1kHz | : < 0.003% |
| Channel unbalance at 1kHz | : ±1dB |
| Channel separation at 1kHz | : > 60dB |
| De-emphasis | : 0 or 15/50 mS (Switched by subcode on the disc) |
| MPEG 1 Layer 3 (MP3-CD) | : MPEG AUDIO |
| MP3-CD Bit Rate | : 56-256 kbps |
| MP3-CD Sampling Frequencies | : 32 kHz, 44.1kHz, 48kHz |
| Recording Format | : ISO 9660<br>UDF format not supported |

[....] Values indicated are strictly for "Cenelec version" only

1) Frequency response in each setting is software controlled.

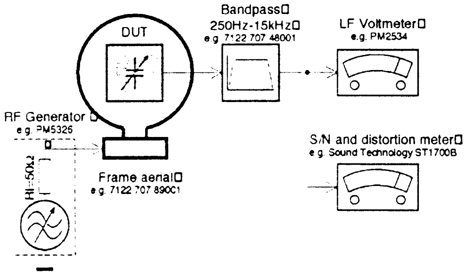
# MEASUREMENT SETUP

## *Tuner FM*


RF Generator
e.g. PM5326
RI=50Ω
DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

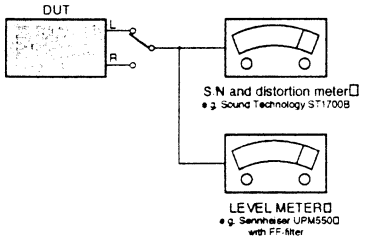
## *Tuner AM (MW,LW)*


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
RI=50Ω
Frame aerial
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday's cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

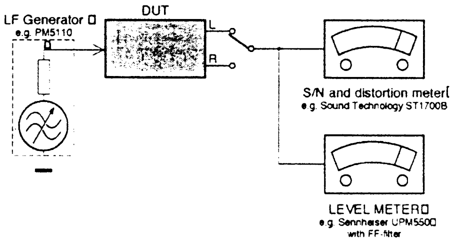
## *CD*

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

## *Recorder*

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


LF Generator
e.g. PM5110
DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

# SERVICE AIDS

**Service Tools:**

| | |
|---|---|
| Universal Torx driver holder | 4822 395 91019 |
| Torx bit T10 150mm | 4822 395 50456 |
| Torx driver set T6-T20 | 4822 395 50145 |
| Torx driver T10 extended | 4822 395 50423 |

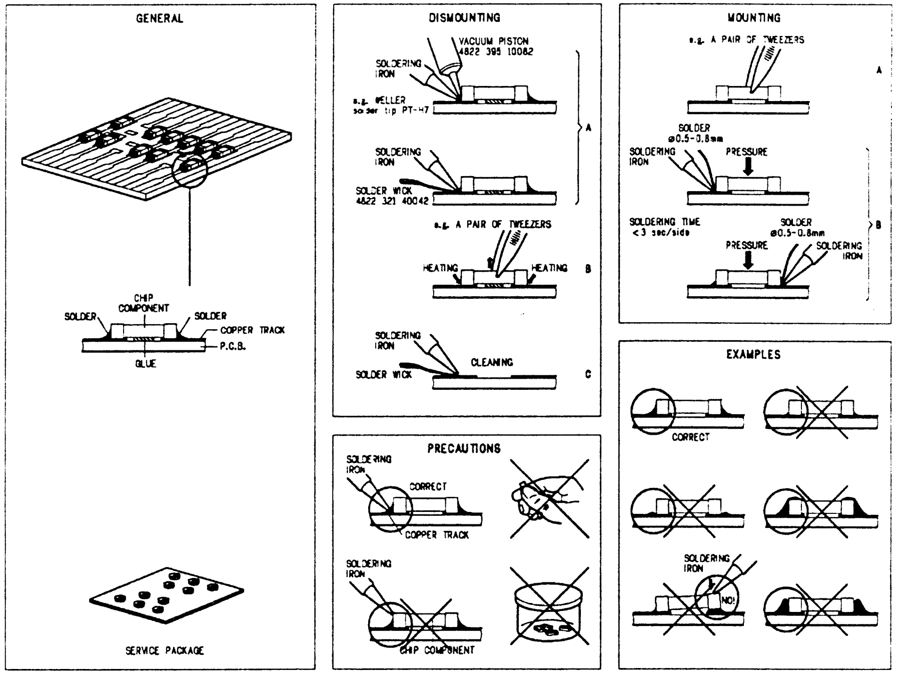
**Compact Disc:**

| | |
|---|---|
| SBC426/426A Test disc 5 + 5A | 4822 397 30096 |
| SBC442 Audio Burn-in test disc 1kHz | 4822 397 30155 |
| SBC429 Audio Signals disc | 4822 397 30184 |
| Dolby Pro-logic Test Disc | 4822 395 10216 |

**ESD Equipment:**

| | |
|---|---|
| Anti-static table mat - large 1200x650x1.25mm | 4822 466 10953 |
| anti-static table mat - small 600x650x1.25mm | 4822 466 10958 |
| Anti-static wristband | 4822 395 10223 |
| Connectorbox (1MΩ) | 4822 395 11307 |
| Extension cable (to connect wristband to conn.box) | 4822 320 11305 |
| Connecting cable (to connect table mat to conn.box) | 4822 320 11306 |
| Earth cable (to Connect product to mat or box) | 4822 320 11308 |
| Complete kit ESD3 (combining all above products) | 4822 320 10671 |
| Wristband tester | 4822 344 13999 |

## HANDLING CHIP COMPONENTS


GENERAL
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON
4822 395 10082
SOLDERING IRON
e.g. WELLER solder tip PT-H7
A
SOLDERING IRON
SOLDER WICK
4822 321 40042
e.g. A PAIR OF TWEEZERS
HEATING
HEATING
B
SOLDERING IRON
CLEANING
SOLDER WICK
C
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
⌀0.5-0.8mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
< 3 sec/side
SOLDER
⌀0.5-0.8mm
PRESSURE
SOLDERING IRON
B
PRECAUTIONS
SOLDERING IRON
CORRECT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
CORRECT
SOLDERING IRON
NO!

## ESD

(GB) **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

(F) **ATTENTION**

Tous les IC et beaucoup d autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise se soient également à ce potentiel.

(D) **WARNUNG**

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall uber ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(NL) **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast

(F)
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)
Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

**"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."**

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

**CLASS 1**
**LASER PRODUCT**

(GB) **Warning !**

Invisible laser radiation when open
Avoid direct exposure to beam.

(S) **Varning !**

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(SF) **Varoitus !**

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen!

(DK) **Advarse !**

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling

---

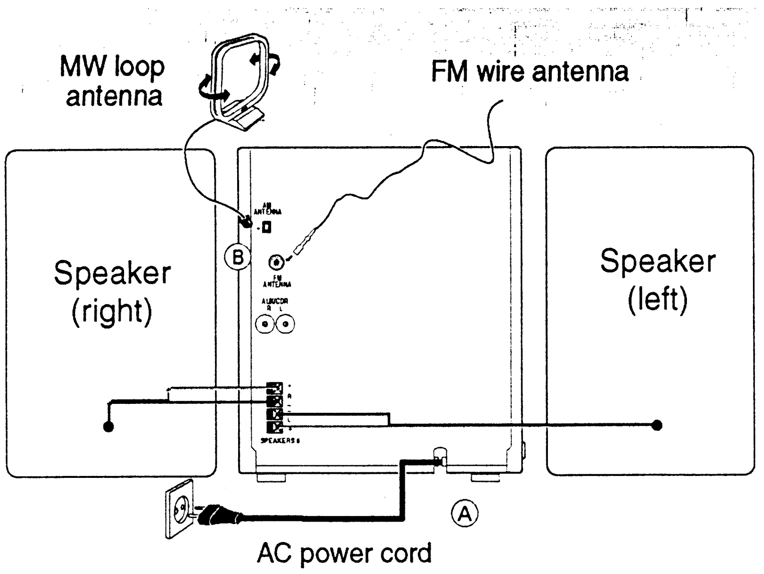
## SERVICE INSTRUCTION

Safety regulations require that after a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the AC Power lead for external damage.
- Check the strain relief of the AC Power cord for proper function.
- Check the electrical DC resistance between the AC Power Plug and the secondary side (only for sets which have a AC Power isolated power supply):

    1. Unplug the AC Power cord and connect a wire between the two pins of the AC Power plug.
    2. Set the AC Power switch to the "on" position (keep the AC Power cord unplugged!).
    3. Measure the resistance value between the pins of the AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
    4. Switch "off" the set, and remove the wire between the two pins of the AC Power plug.

- Check the cabinet for defects, to avoid touching of any inner parts by the customer.



## Rear connections

***The type plate is located at the rear of the system.***
***For users in the U.K.: please follow the instructions .***

### Ⓐ Power

Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.

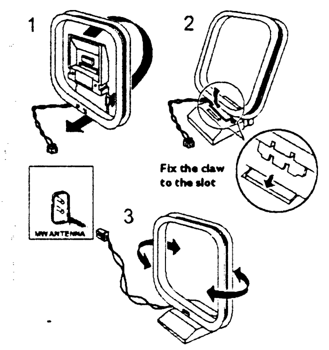
***WARNING!***
***– For optimal performance, use only the original power cable.***
***– Never make or change any connections with the power switched on.***

***To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it*** *(not available for all versions)*.

### Ⓑ Antennas Connection

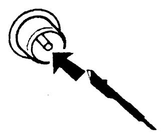
Connect the supplied MW loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

**MW Antenna**



Position the antenna as far as possible from a TV, VCR or other radiation source.

**FM Antenna**

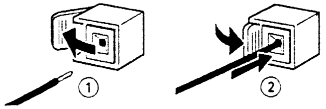


For better FM stereo reception, connect an outdoor FM antenna to the FM ANTENNA terminal.

### Ⓒ Speakers Connection

**Front Speakers**

Connect the speaker wires to the SPEAKERS terminals, right speaker to "R" and left speaker to "L", coloured (marked) wire to "+" and black (unmarked) wire to "–".



Fully insert the stripped portion of the speaker wire into the terminal as shown.

*Notes:*
*– For optimal sound performance, use the supplied speakers.*
*– Do not connect more than one speaker to any one pair of +/– speaker terminals.*
*– Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.*

## Optional connection

The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

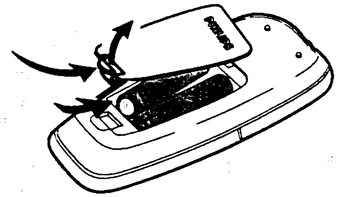
### Connecting other equipment to your system

Use a cinch cable to connect **AUX/CDR** to the analogue audio out terminals of an external equipment (TV, VCR, Laser Disc player, DVD player or CD Recorder).

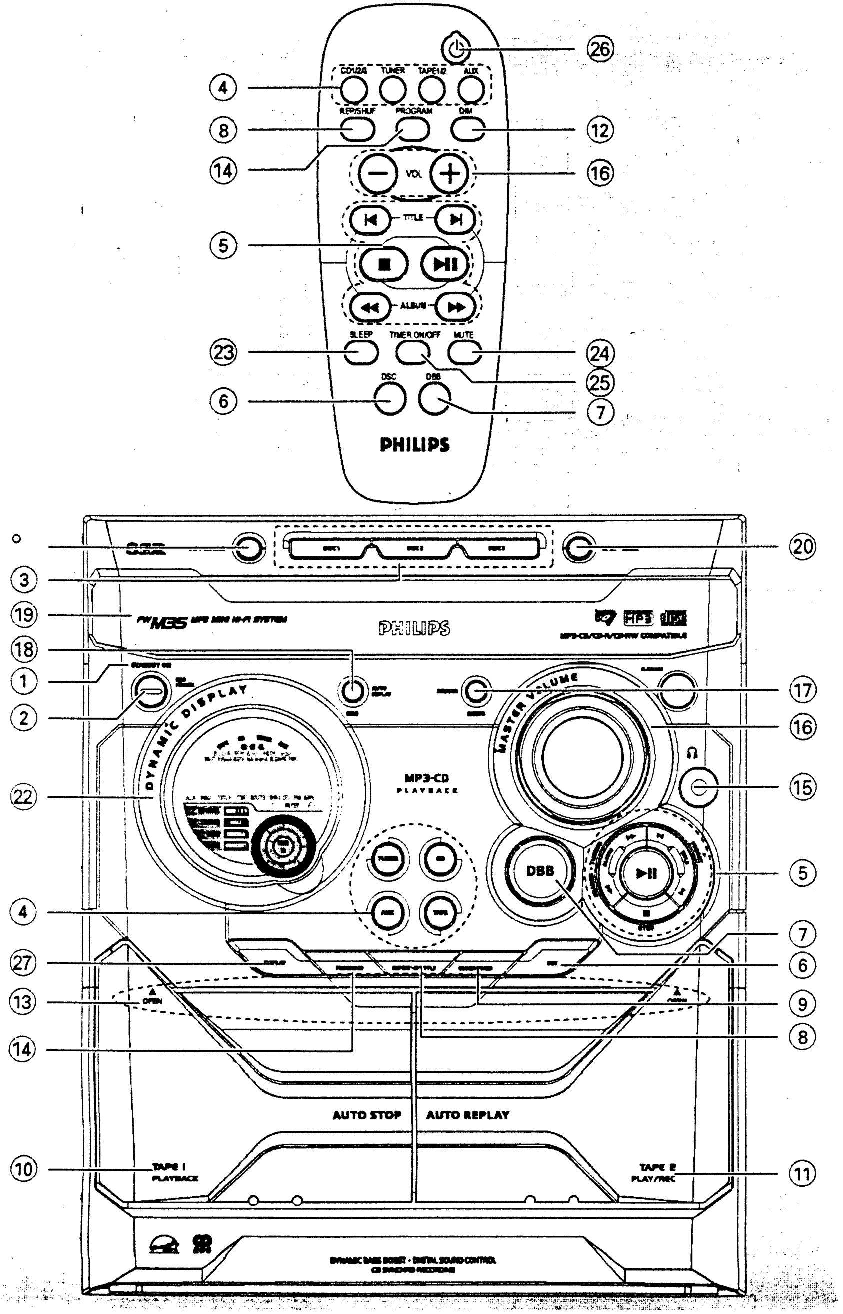
*Note:*
*– If you are connecting equipment with a mono output (a single audio out terminal), connect it to the AUX/CDR left terminal. Alternatively, you can use a "single to double" cinch cable (the output sound still remain mono).*

## Inserting batteries into the remote control

Insert two batteries (Type R03 or AAA) into the remote control with the correct polarity as indicated by the "+" and "–" symbols inside the battery compartment.



***CAUTION!***
***– Remove batteries if they are exhausted or will not be used for a long time.***
***– Do not use old and new or different types of batteries in combination.***
***– Batteries contain chemical substances, so they should be disposed off properly.***


㉖
④
⑧
⑫
⑭
⑯
⑤
㉓
㉔
㉕
⑥
⑦
CD1/2/3
TUNER
TAPE1/2
AUX
REP/SHUF
PROGRAM
DIM
VOL
TITLE
ALBUM
SLEEP
TIMER ON/OFF
MUTE
DSC
DBB
PHILIPS
⑳
③
⑲
⑱
①
②
⑰
⑯
⑮
㉒
⑤
④
⑦
㉗
⑥
⑬
⑨
⑭
⑧
⑩
⑪
PHILIPS
DYNAMIC DISPLAY
MASTER VOLUME
MP3-CD PLAYBACK
DBB
OPEN
AUTO STOP
AUTO REPLAY
TAPE 1 PLAYBACK
TAPE 2 PLAY/REC

# Controls

## Controls on the system and remote control

① **STANDBY ON**
- to switch the system on or to standby mode.

② **ECO POWER**
- to switch the system on or to Eco Power standby mode.

③ **DISC 1/2/3 (CD DIRECT 1/2/3)**
- to select a disc tray for playback.

④ **Source selection** – to select the following :

**CD** (CD 1•2•3)
- to select disc tray 1, 2 or 3.

**TUNER** (BAND)
- to select waveband : FM or MW.

**TAPE** (TAPE 1•2)
- to select tape deck 1 or 2.

**AUX** (VIDEO/CDR)
- to select the input for an additional appliance : AUX or CDR.

⑤ **Mode Selection**

**◀◀ ▶▶ SEARCH• TUNING**

| | |
|---|---|
| for MP3-CD | to select previous/next album. |
| for CD | to search backward/forward. |
| for Tuner | to tune to a lower or higher radio frequency. |
| for Tape | to rewind or fast forward. |
| for Clock | *(on the system only)* to set the hour. |

**■ STOP**

| | |
|---|---|
| for CD/ MP3-CD | to stop playback or to clear a programme. |
| for Tuner | *(on the system only)* to stop programming. |
| for Tape | to stop playback or recording. |
| for Demo | *(on the system only)* to activate/deactivate the demonstration. |
| for Clock | *(on the system only)* to exit clock setting. |
| for Plug & Play | *(on the system only)* to exit plug & play mode. |

**▶II PLAY•PAUSE**

| | |
|---|---|
| for CD/ MP3-CD | to start or interrupt playback. |
| for Tape | to start playback. |
| for Plug & Play | *(on the system only)* to initiate and start plug & play mode. |

**I◀◀ PREV / ▶▶I NEXT (– TITLE +)**

| | |
|---|---|
| for MP3-CD | to select previous/next title. |
| for CD | to skip to the beginning of the current, previous, or next track. |
| for Tuner | to select a preset radio station. |
| for Clock | *(on the system only)* to set the minute. |

⑥ **DSC**
- Selects different types of preset sound equaliser settings (OPTIMAL, JAZZ, ROCK or TECHNO).

⑦ **DBB**
- to select the desired bass boost level. (DBB 1, DBB 2, DBB 3 or DBB OFF)

⑧ **REPEAT/SHUFFLE (REP/SHUF)**
- to playback track(s)/disc(s)/programme repeatedly.
- Turns on/off the random play mode.

⑨ **CLOCK•TIMER (CLK/TIMER)**
- to view the clock.
- set the clock or set the timer (on the set only).

⑩ **Tape deck 1**

⑪ **Tape deck 2**

# Controls

⑫ **DIM MODE**
- to select different brightness for the display screen : DIM 1, DIM 2, DIM 3 or DIM OFF.

⑬ **▲ OPEN**
- to open the tape deck door.

⑭ **PROGRAM**

| | |
|---|---|
| for CD/ MP3-CD | to programme disc tracks. |
| for Tuner | to programme preset radio stations. |
| for Clock | to select 12- or 24-hour clock mode. |

⑮ 🎧
- to connect headphones.

⑯ **VOLUME (VOL +/−)**
- to increase or decrease the volume.

⑰ **NEWS/RECORD**
- to hear News automatically.
- to start recording on tape deck 2.

⑱ **RDS/AUTO REPLAY**
- to select RDS information.
- to select continuous playback in either AUTO REPLAY or ONCE MODE only.

⑲ **Disc tray**

⑳ **OPEN•CLOSE**
- to open or close the disc tray.

° **DISC CHANGE**
- to change disc(s).

**Display screen**
- to view the current status of the system.

㉓ **SLEEP**
- to activate/deactivate or set the sleep timer.

㉔ **MUTE**
- Mutes or restores the volume.

㉕ **TIMER ON/OFF**
- activates/deactivates the timer function.

㉖ ⏻
- to switch the system to standby mode.
- to switch the system to Eco Power standby mode.

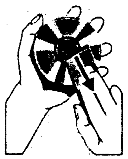
㉗ **DISPLAY**
- Display the album and title name for MP3 disc.

***Notes for remote control:***
***– First, select the source you wish to control by pressing one of the source select keys on the remote control (CD or TUNER, for example).***
***– Then select the desired function (▶, |◀, ▶|, for example).***

# Maintenance

**Cleaning the Cabinet**
Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

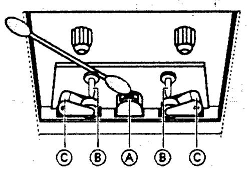
**Cleaning Discs**
When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out. Do not wipe in circular motion.



Do not use solvents such as benzene, thinner, commercially available cleaners, or antistatic spray intended for analogue records.

**Cleaning the disc lens**
After prolonged use, dirt or dust may accumulate at the disc lens. To ensure good playback quality, clean the disc lens with Philips CD Lens Cleaner or any commercially available cleaner. Follow the instructions supplied with cleaner.

**Cleaning the Heads and the Tape Paths**
To ensure good recording and playback quality, clean the heads Ⓐ, the capstan(s) Ⓑ, and pressure roller(s) Ⓒ after every 50 hours of tape operation.
Use a cotton swab slightly moistened with cleaning fluid or alcohol.
You also can clean the heads by playing a cleaning tape once.



**Demagnetising the heads**
Use a demagnetising tape available at your dealer.

# Troubleshooting

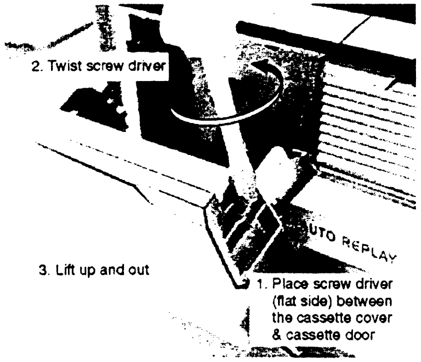
***WARNING***
***Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.***

***If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or Philips for help.***

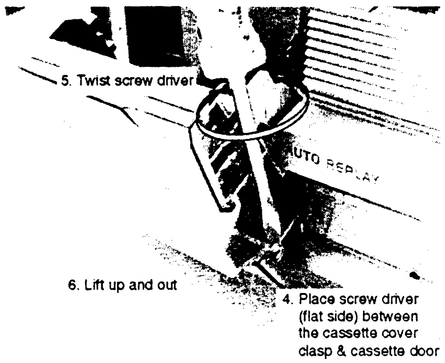
| Problem | Solution |
|---|---|
| **“NO DISC” is displayed.** | Insert a disc.<br>Check if the disc is inserted upside down.<br>Wait until the moisture condensation at the lens has cleared.<br>Replace or clean the disc, see "Maintenance".<br>Use a finalized CD-RW or a correct MP3-CD format disc. |
| **“DISC NOT FINALIZED” is displayed.** | Use a finalised CD-RW or CD-R. |
| **Radio reception is poor.** | If the signal is too weak, adjust the antenna or connect an external antenna for better reception.<br>Increase the distance between the Mini HiFi System and your TV or VCR. |
| **Recording or playback cannot be made.** | Clean deck parts, see "Maintenance".<br>Use only NORMAL (IEC I) tape.<br>Apply a piece of adhesive tape over the missing tab space. |
| **The tape deck door cannot open.** | Remove and reconnect the AC power plug and switch on the system again. |
| **The system does not react when buttons are pressed.** | Remove and reconnect the AC power plug and switch on the system again. |
| **Sound cannot be heard or is of poor quality.** | Adjust the volume.<br>Disconnect the headphones.<br>Check that the speakers are connected correctly.<br>Check if the stripped speaker wire is clamped.<br>Make sure the MP3-CD was recorded within 32-256 kbps bit rate with sampling frequencies at 48 kHz, 44.1 kHz or 32 kHz. |
| **The left and right sound outputs are reversed.** | Check the speaker connections and location. |
| **The remote control does not function properly.** | Select the source (CD or TUNER, for example) before pressing the function button (▶, ⏮, ⏭).<br>Reduce the distance between the remote control and the system.<br>Insert the batteries with their polarities (+/– signs) aligned as indicated.<br>Replace the batteries.<br>Point the remote control directly towards the IR sensor. |
| **The time is not working.** | Set the clock correctly.<br>Press and hold CLOCK•TIMER to switch on the timer.<br>If recording or tape dubbing is in progress, stop recording. |
| **Not all lighted buttons are showing light.** | Press DIM to select DIM OFF display mode. |
| **The Clock/Timer setting is erased.** | Power has been interrupted or the power cord has been disconnected. Reset the clock/timer. |
| **The system displays features automatically and buttons start flashing.** | Press and hold ■ on the system to switch off the demonstration. |

# DISMANTLING INSTRUCTIONS

## *Dismantling of the Cassette Cover*


2. Twist screw driver
3. Lift up and out
1. Place screw driver (flat side) between the cassette cover & cassette door
AUTO REPLAY

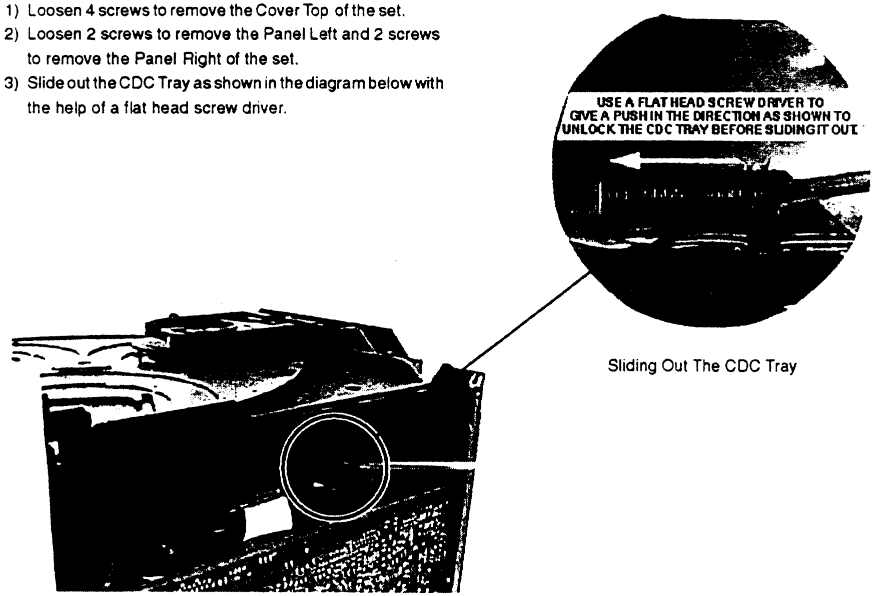
Remove Cassette Upper Cover


5. Twist screw driver
6. Lift up and out
4. Place screw driver (flat side) between the cassette cover clasp & cassette door
AUTO REPLAY

Remove Cassette Nether Cover

## *Dismantling of the CDC Module and Front Panel*

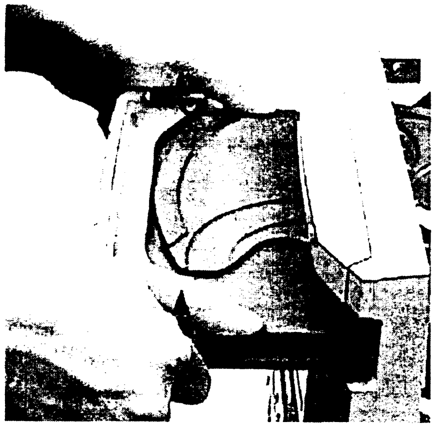
1) Loosen 4 screws to remove the Cover Top of the set.
2) Loosen 2 screws to remove the Panel Left and 2 screws to remove the Panel Right of the set.
3) Slide out the CDC Tray as shown in the diagram below with the help of a flat head screw driver.


USE A FLAT HEAD SCREW DRIVER TO GIVE A PUSH IN THE DIRECTION AS SHOWN TO UNLOCK THE CDC TRAY BEFORE SLIDING IT OUT

Sliding Out The CDC Tray

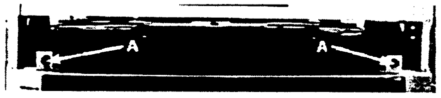
## *Dismantling of the CDC Module and Front Panel*

4) Remove the Cover Tray CDC as indicated.

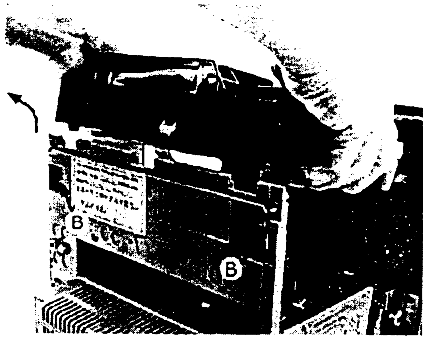


Remove Cover Tray CDC

5) Loosen 2 screws A and 2 screws B to remove the CDC Module as indicated.
6) Remove 2 screws at the bottom to separate the Front Panel Assembly from the Plate Bottom .

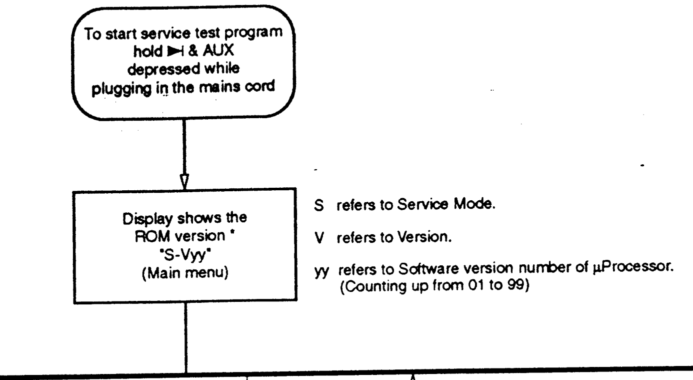


Front View CDC



Remove CDC Module

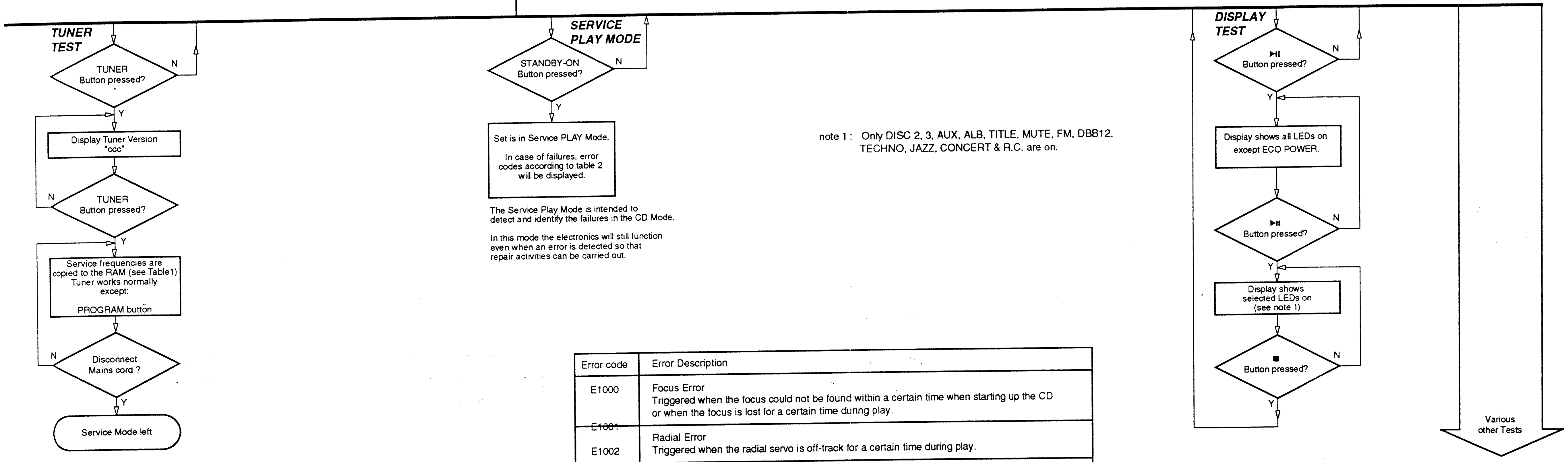
# SERVICE TEST PROGRAM


To start service test program hold ▶▶I & AUX depressed while plugging in the mains cord
Display shows the ROM version " "S-Vyy" (Main menu)

S refers to Service Mode.

V refers to Version.

yy refers to Software version number of µProcessor. (Counting up from 01 to 99)


TUNER TEST
TUNER Button pressed?
N
Y
Display Tuner Version "ccc"
TUNER Button pressed?
N
Y
Service frequencies are copied to the RAM (see Table1) Tuner works normally except: PROGRAM button
Disconnect Mains cord ?
N
Y
Service Mode left
SERVICE PLAY MODE
STANDBY-ON Button pressed?
N
Y
Set is in Service PLAY Mode.
In case of failures, error codes according to table 2 will be displayed.
DISPLAY TEST
▶II Button pressed?
N
Y
Display shows all LEDs on except ECO POWER.
▶II Button pressed?
N
Y
Display shows selected LEDs on (see note 1)
■ Button pressed?
N
Y
Various other Tests

The Service Play Mode is intended to detect and identify the failures in the CD Mode.

In this mode the electronics will still function even when an error is detected so that repair activities can be carried out.

note 1 : Only DISC 2, 3, AUX, ALB, TITLE, MUTE, FM, DBB12, TECHNO, JAZZ, CONCERT & R.C. are on.

| PRESET | Europe "EUR" | East Eur. Extended-band "EAS" | East Eur. "EAS" | USA "USA" | Oversea "OSE" |
|---|---|---|---|---|---|
| 1 | 87.5MHz | 65.81MHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 2 | 108MHz | 108MHz | 108MHz | 108MHz | 108MHz |
| 3 | 531kHz | 74MHz | 531kHz | 530kHz | 530/531kHz* |
| 4 | 1602kHz | 87.5MHz | 1602kHz | 1700kHz | 1700/1602kHz* |
| 5 | 558kHz | 531kHz | 558kHz | 560kHz | 560/558kHz* |
| 6 | 1494kHz | 1602kHz | 1494kHz | 1500kHz | 1500/1494kHz* |
| 7 | 153kHz | 558kHz | 87.5MHz | 98MHz | 98/87.5MHz* |
| 8 | 279kHz | 1494kHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 9 | 198kHz | 98MHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 10 | 98MHz | 70.01MHz | 87.5MHz | 87.5MHz | 87.5MHz |
| 11 | 87.5MHz | 65.81MHz | 98MHz | 87.5MHz | 87.5/98MHz* |

Table 1

Note: * Depending on the selected grid frequency (9 or 10kHz)
By holding the TUNER and ▶▶I buttons depressed while switching on the Mains supply, one of the undermentioned features will be activated:

- the tuning grid frequency is toggled between 9kHz and 10kHz for the Oversea (/21) version.
- the extended FM1 (65.81MHz - 74MHz) is toggled on and off for East Eur. (/34) version.

| Error code | Error Description |
|---|---|
| E1000 | Focus Error<br>Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play. |
| ~~E1001~~<br>E1002 | Radial Error<br>Triggered when the radial servo is off-track for a certain time during play. |
| E1003 | Sledge In Error<br>The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed by. Inner-switch or sledge motor problem. |
| E1005 | Sledge Out Error<br>The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem. |
| E1006 | Jump-offtrack error<br>Triggered in normal play when the jump destination could not be found within a certain time.<br>When this error occurred, software will try to recover by initiating the jump command again.<br>If it is recoverable, the disc will continue to play. |
| E1007 | Subcode Error<br>Triggered when a new subcode was missing for a certain time during play. |
| E1008 | PLL Error<br>The Phase Lock Loop could not lock within a certain time. |
| E1020 | Turntable Motor Error<br>Generated when the CD could not reached 75% of speed during startup within a certain time.<br>Discmotor problem. |
| ~~E1070~~<br>E1071 | Focus Search Error<br>The focus point has not been found within a certain time. |
| E1079 | This happens when the carousel switch is defective and closed all the time, or when the carousel is blocked when it is located exactly at a disc position. |
|  | This happens when the carousel switch is defective and does not closed electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 5 Sec. |
|  | The drawer could not open or enter the inside position and is opening again. This happen when the drawer is blocked and cannot go fully inside or when the drawer switch is defective and does not close. |

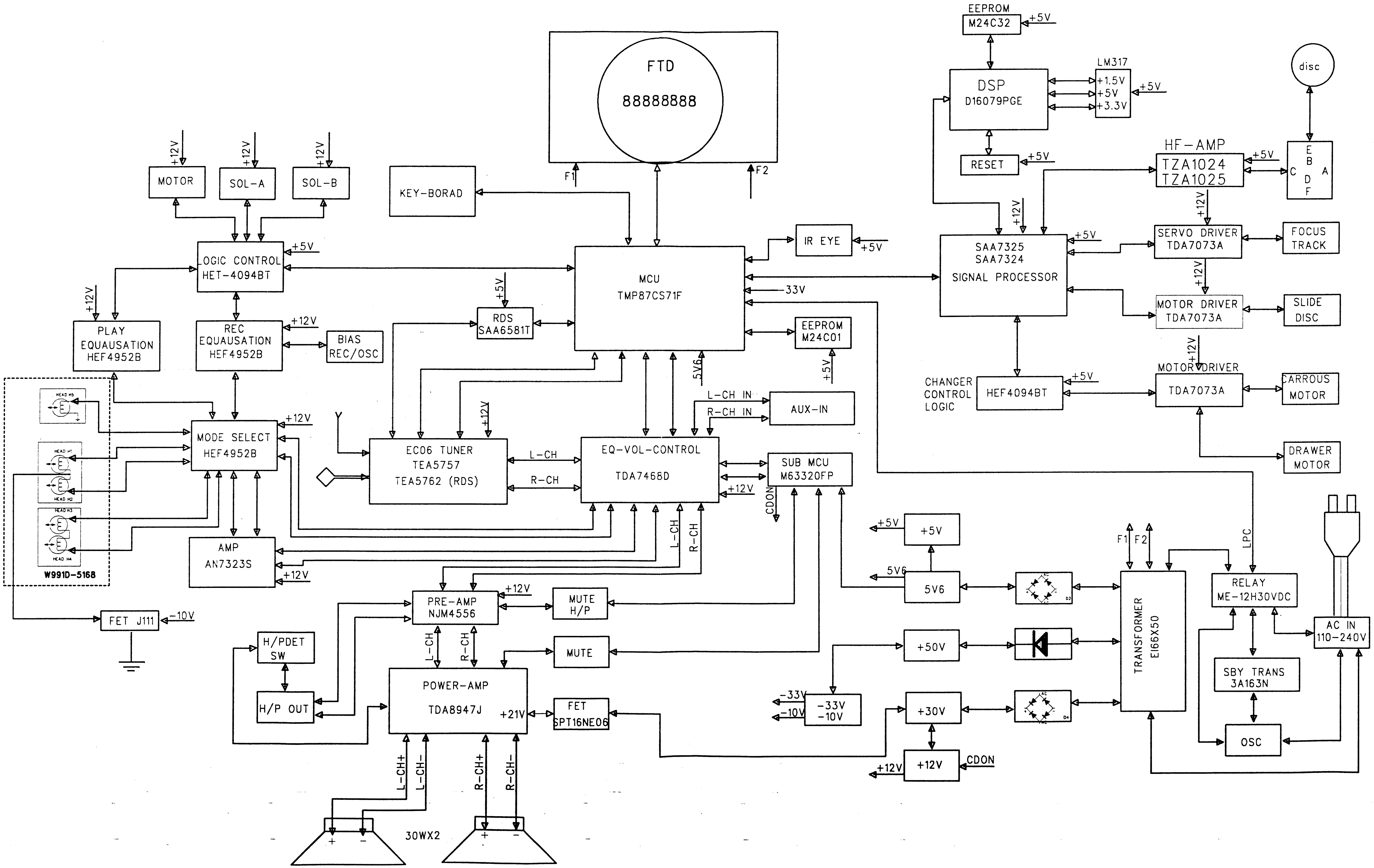
Table 2

## DEMO Mode

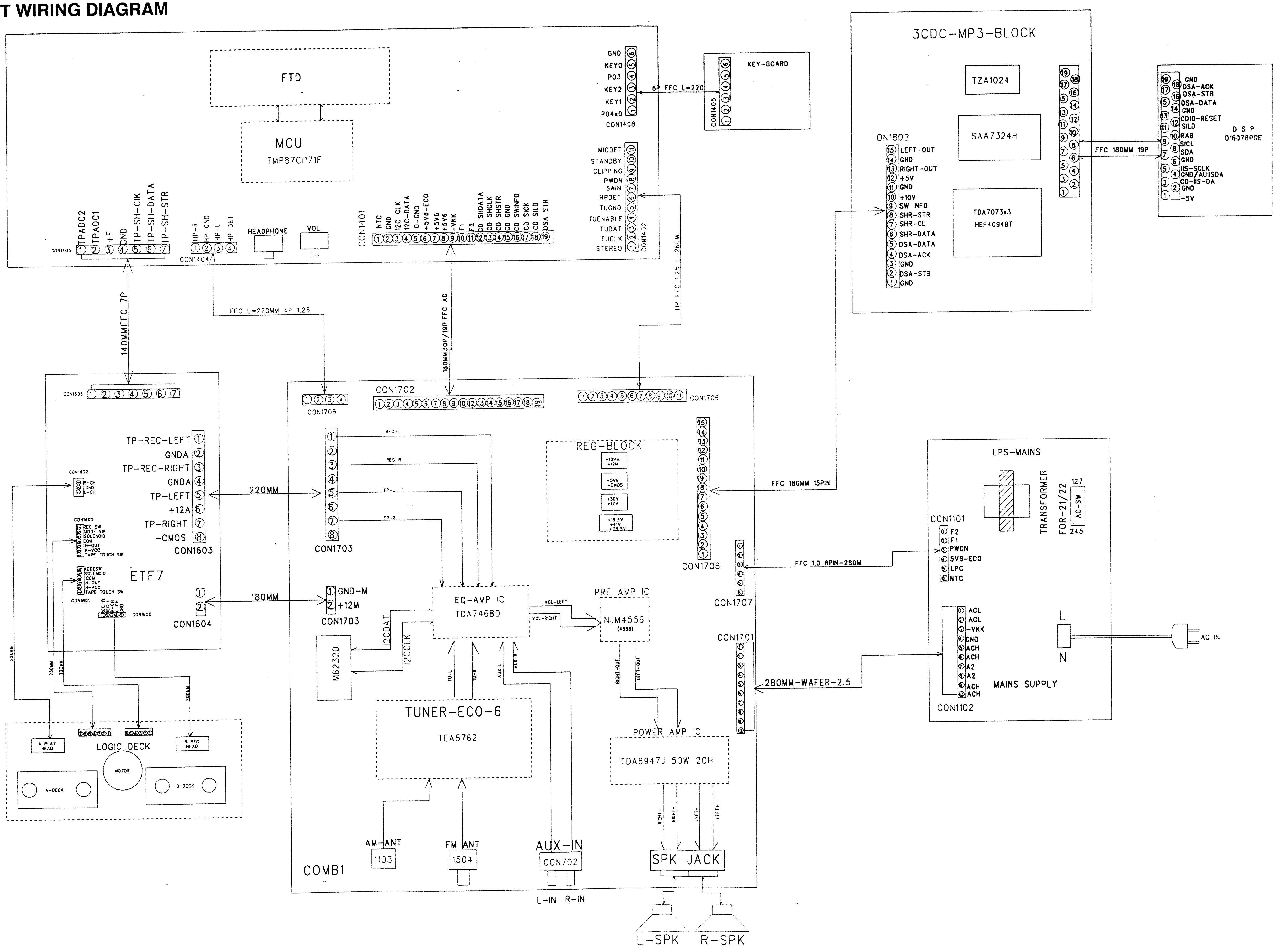
|  | ACTION |
|---|---|
| To Switch off | Hold the ■ button down for 5 seconds during the DEMO display, the set will confirm with "DEMO OFF" and switch to Standby. |
| To Switch on | Hold the ■ button down for 5 seconds during Standby, DEMO will begin. |

| TEST | Activated with | ACTION |
|---|---|---|
| EEPROM TEST | ▶▶I<br>■ to Exit | A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "FAIL" will be displayed. |
| EEPROM FORMAT | I◀◀ | Load default data. Display shows "NEW" for 1 second.<br>***Caution!***<br>***All presets from the customer will be lost!!*** |
| ROTARY ENCODER TEST | Volume Knob or Jog Shuttle knob | Display shows value for 2 seconds. Values increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached. |
| LEAVE SERVICE TESTPROGRAM | Disconnect mains cord |  |

# SET BLOCK DIAGRAM


FTD
88888888
F1
F2
EEPROM
M24C32
+5V
DSP
D16079PGE
LM317
+1.5V
+5V
+3.3V
RESET
disc
HF-AMP
TZA1024
TZA1025
E B A C D F
MOTOR
SOL-A
SOL-B
+12V
KEY-BORAD
LOGIC CONTROL
HET-4094BT
MCU
TMP87CS71F
-33V
IR EYE
SAA7325
SAA7324
SIGNAL PROCESSOR
SERVO DRIVER
TDA7073A
FOCUS
TRACK
MOTOR DRIVER
TDA7073A
SLIDE
DISC
PLAY
EQUAUSATION
HEF4952B
REC
EQUAUSATION
HEF4952B
BIAS
REC/OSC
RDS
SAA6581T
EEPROM
M24C01
5V6
CHANGER
CONTROL
LOGIC
HEF4094BT
MOTOR DRIVER
TDA7073A
CARROUS
MOTOR
DRAWER
MOTOR
MODE SELECT
HEF4952B
EC06 TUNER
TEA5757
TEA5762 (RDS)
L-CH
R-CH
EQ-VOL-CONTROL
TDA7466D
L-CH IN
R-CH IN
AUX-IN
SUB MCU
M63320FP
CDON
W991D-5168
AMP
AN7323S
FET J111
-10V
PRE-AMP
NJM4556
MUTE
H/P
MUTE
H/PDET
SW
H/P OUT
POWER-AMP
TDA8947J
+21V
FET
SPT16NE06
L-CH+
L-CH-
R-CH+
R-CH-
30WX2
+5V
5V6
+50V
-33V
-10V
+30V
+12V
CDON
F1
F2
TRANSFORMER
EI66X50
LPC
RELAY
ME-12H30VDC
SBY TRANS
3A163N
OSC
AC IN
110-240V

## SET WIRING DIAGRAM


FTD
MCU
TMP87CP71F
GND
KEY0
P03
KEY2
KEY1
P04x0
CON1408
6P FFC L=220
KEY-BOARD
CON1405
MICDET
STANDBY
CLIPPING
PWDN
SAIN
HPDET
TUGND
TUENABLE
TUDAT
TUCLK
STEREO
CON1402
TPADC2
TPADC1
+F
GND
TP-SH-CIK
TP-SH-DATA
TP-SH-STR
CON1405
HP-R
HP-GND
HP-L
HP-DET
CON1404
HEADPHONE
VOL
CON1401
NTC
GND
12C-CLK
12C-DATA
D-GND
+5V6-ECO
+5V6
+5V6
-VKK
F1
F2
CD SHDATA
CD SHCLK
CD SHSTR
CD GND
CD SWINFO
CD SICK
CD SILD
DSA STR
140MMFFC 7P
FFC L=220MM 4P 1.25
180MM30P/19P FFC AD
11P FFC 1.25 L=260M
3CDC-MP3-BLOCK
TZA1024
SAA7324H
TDA7073x3
HEF4094BT
ON1802
LEFT-OUT
GND
RIGHT-OUT
+5V
GND
+10V
SW INFO
SHR-STR
SHR-CL
SHR-DATA
DSA-DATA
DSA-ACK
GND
DSA-STB
GND
FFC 180MM 19P
GND
DSA-ACK
DSA-STB
DSA-DATA
GND
CD10-RESET
SILD
RAB
SICL
SDA
GND
IIS-SCLK
GND/AUIISDA
CD-IIS-DA
GND
+5V
D S P
D16078PGE
CON1506
TP-REC-LEFT
GNDA
TP-REC-RIGHT
GNDA
TP-LEFT
+12A
TP-RIGHT
-CMOS
CON1603
CON1602
R-CH
GND
L-CH
CON1605
REC SW
MODE SW
SOLENOID
COM
H-OUT
H-VCC
TAPE TOUCH SW
MODESW
SOLENOID
COM
H-OUT
H-VCC
TAPE TOUCH SW
CON1601
ETF7
CON1600
CON1604
220MM
180MM
220MM
220MM
220MM
200MM
A PLAY HEAD
LOGIC DECK
B REC HEAD
MOTOR
A-DECK
B-DECK
CON1705
CON1702
CON1706
REC-L
REC-R
TP-L
TP-R
CON1703
REG-BLOCK
+12VA
+12M
+5V6
-CMOS
+30V
+17V
+19.5V
+41V
+28.5V
CON1706
FFC 180MM 15PIN
GND-M
+12M
CON1703
EQ-AMP IC
TDA7468D
VOL-LEFT
VOL-RIGHT
PRE AMP IC
NJM4556
(4556)
I2CDAT
I2CCLK
M62320
TU-L
TU-R
AUX-L
AUX-R
RIGHT-OUT
LEFT-OUT
CON1707
FFC 1.0 6PIN-280M
CON1701
280MM-WAFER-2.5
TUNER-ECO-6
TEA5762
POWER AMP IC
TDA8947J 50W 2CH
RIGHT-
RIGHT+
LEFT-
LEFT+
AM-ANT
1103
FM ANT
1504
AUX-IN
CON702
L-IN R-IN
SPK JACK
COMB1
L-SPK
R-SPK
LPS-MAINS
TRANSFORMER
FOR-21/22
127
AC-SW
245
CON1101
F2
F1
PWDN
5V6-ECO
LPC
NTC
ACL
ACL
-VKK
GND
ACH
ACH
A2
A2
ACH
ACH
CON1102
MAINS SUPPLY
L
N
AC IN

# FRONT & KEY BOARD

## TABLE OF CONTENTS

Internal IC Diagram & Pin Assignment ............................ 5-1
Internal IC Diagram & Pin Description ............................ 5-2
Internal IC Diagram & Pin Description ............................ 5-3
PCB Layout Top View ...................................................... 5-4
PCB Layout Bottom View ................................................. 5-5
Circuit Diagram (MCU Part) ............................................ 5-6
Circuit Diagram (Mic Part) .............................................. 5-7
Electrical Parts List ........................................................... 5-8

Remark: For Ver. 22, the whole Front Board Ass'y can be orderd with 12nc: 9940 000 01504

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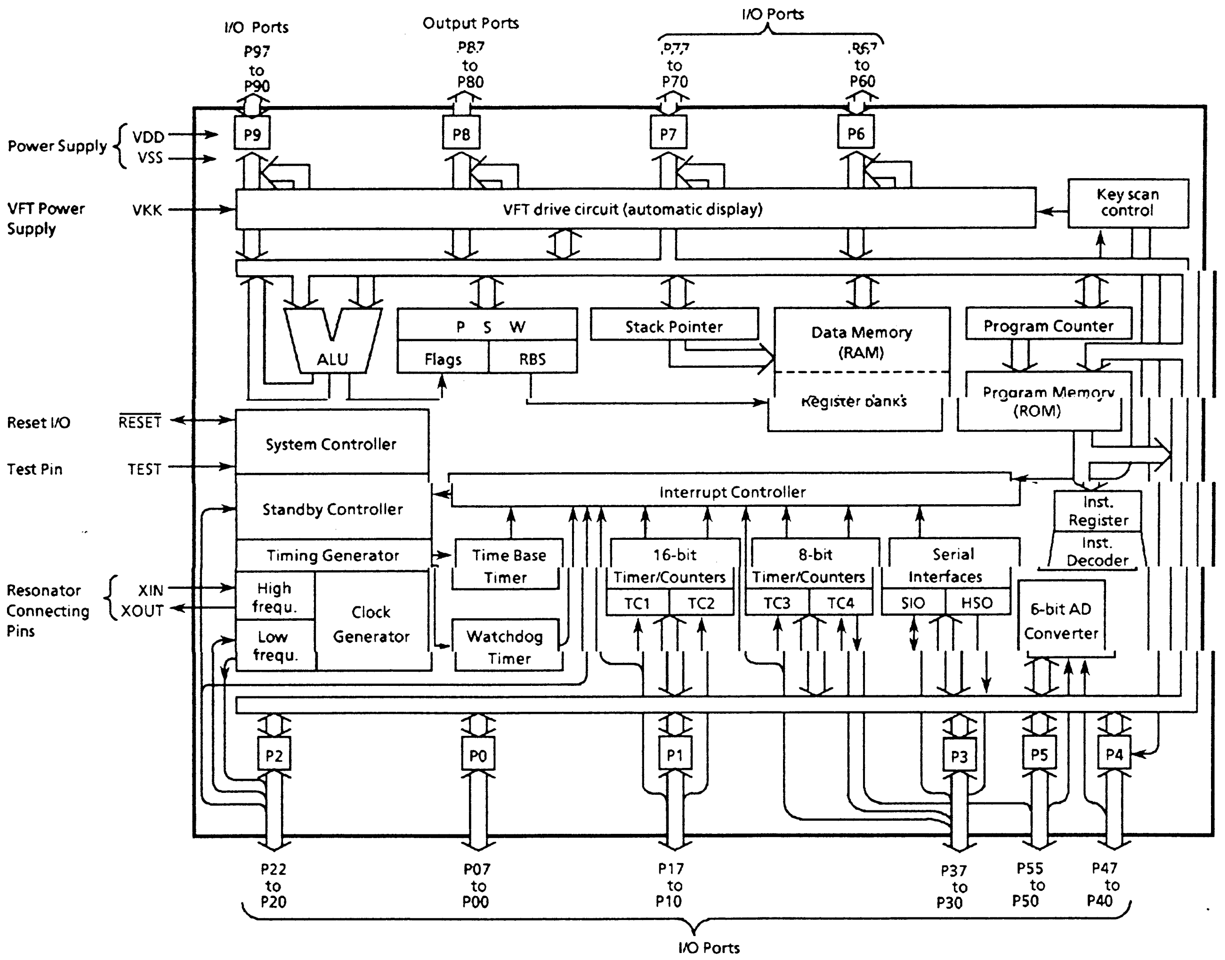
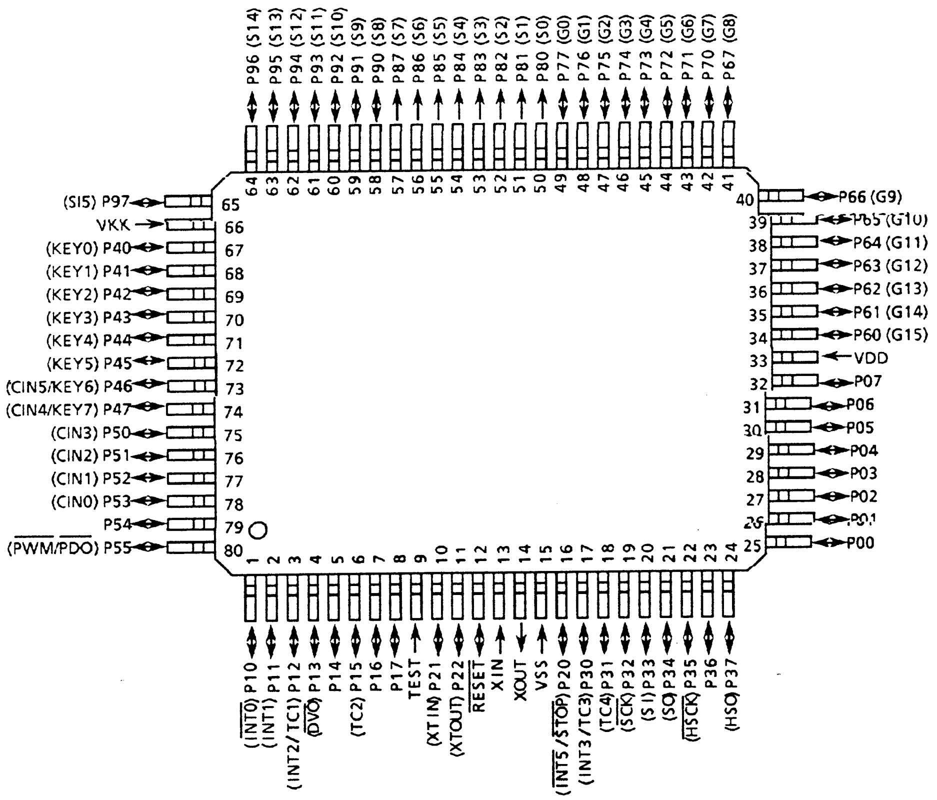
## INTERNAL BLOCK DIAGRAM
## MICROCONTROLLER - IC TMP87PS71F



I/O Ports P97 to P90
Output Ports P87 to P80
I/O Ports P77 to P70 P67 to P60
Power Supply VDD VSS
VFT Power Supply VKK
P9
P8
P7
P6
VFT drive circuit (automatic display)
Key scan control
ALU
P S W
Flags
RBS
Stack Pointer
Data Memory (RAM)
Register banks
Program Counter
Program Memory (ROM)
Reset I/O RESET
Test Pin TEST
System Controller
Standby Controller
Interrupt Controller
Inst. Register
Inst. Decoder
Timing Generator
Time Base Timer
16-bit Timer/Counters
TC1
TC2
8-bit Timer/Counters
TC3
TC4
Serial Interfaces
SIO
HSO
6-bit AD Converter
Resonator Connecting Pins XIN XOUT
High frequ.
Low frequ.
Clock Generator
Watchdog Timer
P2
P0
P1
P3
P5
P4
P22 to P20
P07 to P00
P17 to P10
P37 to P30
P55 to P50
P47 to P40
I/O Ports

# PIN ASSIGNMENT (TOP VIEW)
# MICROCONTROLLER - IC TMP87PS71F


P96 (S14)
P95 (S13)
P94 (S12)
P93 (S11)
P92 (S10)
P91 (S9)
P90 (S8)
P87 (S7)
P86 (S6)
P85 (S5)
P84 (S4)
P83 (S3)
P82 (S2)
P81 (S1)
P80 (S0)
P77 (G0)
P76 (G1)
P75 (G2)
P74 (G3)
P73 (G4)
P72 (G5)
P71 (G6)
P70 (G7)
P67 (G8)
64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41
(SI5) P97 65
VKK 66
(KEY0) P40 67
(KEY1) P41 68
(KEY2) P42 69
(KEY3) P43 70
(KEY4) P44 71
(KEY5) P45 72
(CIN5/KEY6) P46 73
(CIN4/KEY7) P47 74
(CIN3) P50 75
(CIN2) P51 76
(CIN1) P52 77
(CIN0) P53 78
P54 79
(PWM/PDO) P55 80
40 P66 (G9)
39 P65 (G10)
38 P64 (G11)
37 P63 (G12)
36 P62 (G13)
35 P61 (G14)
34 P60 (G15)
33 VDD
32 P07
31 P06
30 P05
29 P04
28 P03
27 P02
26 P01
25 P00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
(INT0) P10
(INT1) P11
(INT2/TC1) P12
(DVO) P13
P14
(TC2) P15
P16
P17
TEST
(XTIN) P21
(XTOUT) P22
RESET
XIN
XOUT
VSS
(INT5/STOP) P20
(INT3/TC3) P30
(TC4) P31
(SCK) P32
(SI) P33
(SO) P34
(HSCK) P35
P36
(HSO) P37

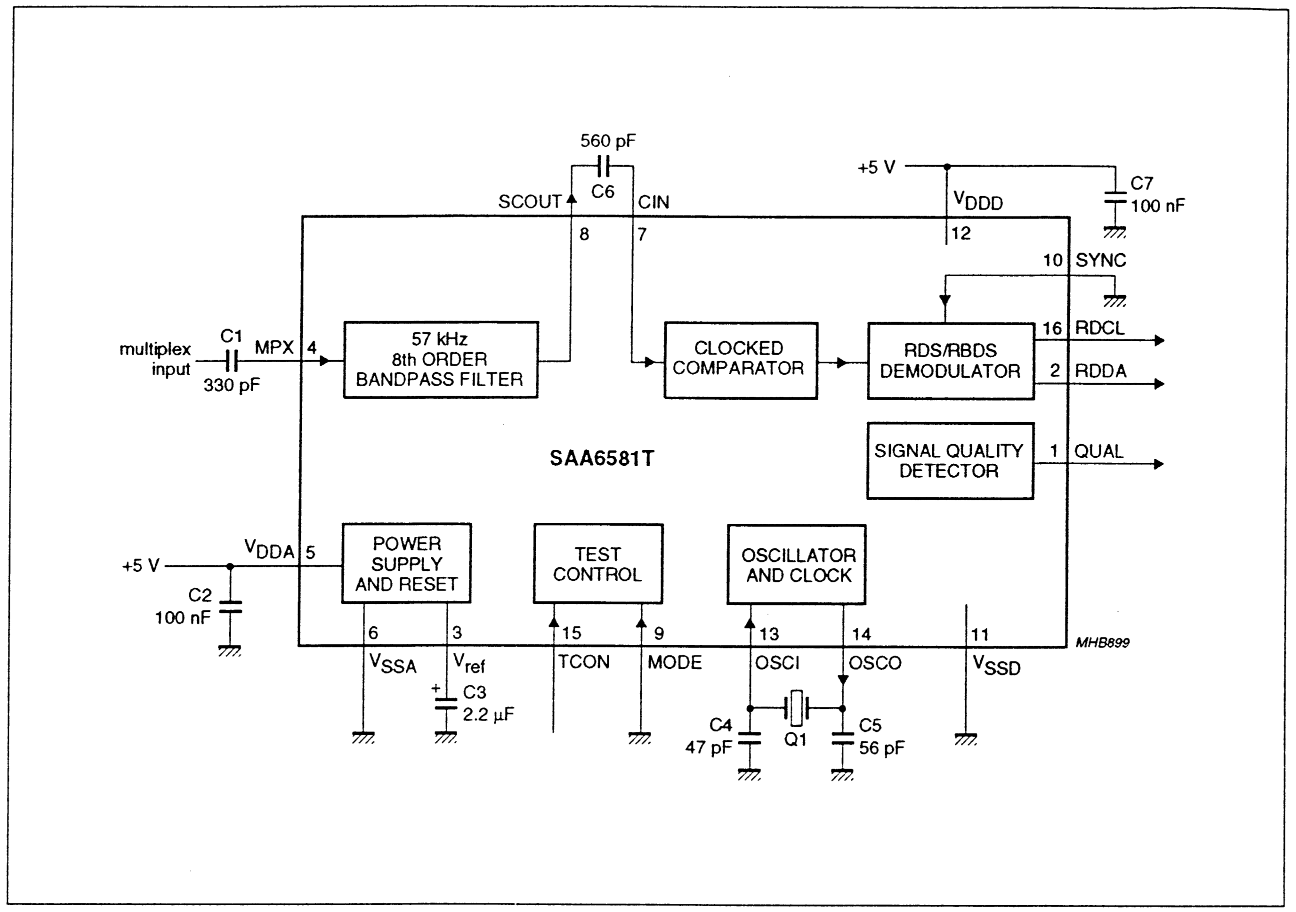
# PIN DESCRIPTION
# MICROCONTROLLER - IC TMP87PS71F

## Pin Function

| Pin Name | Input / Output | Function | |
|---|---|---|---|
| P07 to P00 | I/O | Two 8-bit programmable input/output ports (tri-state).<br>Each bit of these ports can be individually configured as an input or an output under software control.<br>During reset, all bits are configured as inputs.<br>When used as a divider output, the latch must be set to "1". | |
| P17, P16, P14 | I/O | | |
| P15 (TC2) | I/O (Input) | | Timer/Counter 2 input |
| P13 ($\overline{\text{DVO}}$) | I/O (Output) | | Divider output |
| P12 (INT2 / TC1) | I/O (Input) | | External interrupt input 2 or Timer/Counter 1 input |
| P11 (INT1) | | | External interrupt input 1 |
| P10 ($\overline{\text{INT0}}$) | | | External interrupt input 0 |
| P22 (XTOUT) | I/O (Output) | 3-bit input/output port with latch.<br>When used as an input port, the latch must be set to "1". | Resonator connecting pins (32.768 kHz). For inputting external clock, XTIN is used and XTOUT is opened. |
| P21 (XTIN) | I/O (Input) | | |
| P20 ($\overline{\text{INT5}}$ / $\overline{\text{STOP}}$) | | | External interrupt input 5 or STOP mode release signal input |
| P37 (HSO) | I/O (Output) | 8-bit input/output port with latch.<br>When used as an input port, a HSO output, a SIO input/output, a timer/counter input, or an interrupt input, the latch must be set to "1". | HSO serial data output |
| P36 | I/O | | |
| P35 ($\overline{\text{HSCK}}$) | I/O (Output) | | HSO serial clock output |
| P34 (SO) | | | SIO serial data output |
| P33 (SI) | I/O (Input) | | SIO serial data input |
| P32 ($\overline{\text{SCK}}$) | I/O (I/O) | | SIO serial clock input/output |
| P31 (TC4) | I/O (Input) | | Timer/Counter 4 input |
| P30 (INT3 / TC3) | | | External interrupt input 3 or Timer/Counter 3 input |
| P47 (CIN4 / KEY7),<br>P46 (CIN5 / KEY6) | I/O (Input) | 8-bit input/output port with latch.<br>When used as an input port, the latch must be set to "1". | Comparator inputs or Key scan inputs |
| P45 (KEY5) to P40 (KEY0) | | | Key scan inputs |
| P55 ($\overline{\text{PWM}}$ / $\overline{\text{PDO}}$) | I/O (Output) | 6-bit input/output port with latch.<br>When used as an input port, a comparator input, or a $\overline{\text{PWM}}$ / $\overline{\text{PDO}}$ output, the latch must be set to "1". | 8-bit PWM output or 8-bit programmable divider output |
| P54 | I/O | | |
| P53 (CIN0) to P50 (CIN3) | I/O (Input) | | Comparator inputs |
| P67 (G8) to P60 (G15) | I/O (Output) | Three 8-bit high breakdown voltage I/O ports with the latch. When used as a VFT driver output, the latch must be cleared to "0". | VFT digit driver outputs |
| P77 (G0) to P70 (G7) | | | |
| P97 (S15) to P90 (S8) | | | VFT segment driver outputs (Key strobe outputs) |
| P87 (S7) to P80 (S0) | Output (Output) | 8-bit high breakdown voltage output port with latch. When used as VFT driver output, the latch must be cleared to "0". | |
| XIN, XOUT | Input, Output | Resonator connecting pins for high-frequency clock.<br>For inputting external clock, XIN is used and XOUT is opened. | |
| $\overline{\text{RESET}}$ | I/O | Reset signal input or watchdog timer output/address-trap-reset output/system-clock-reset output. | |
| TEST | Input | Test pin for out-going test. Be tied to low. | |
| VDD, VSS | Power Supply | + 5 V, 0 V (GND) | |
| VKK | | VFT driver power supply | |

# INTERNAL BLOCK DIAGRAM
# RDS/RBDS DEMODULATOR - IC SAA6581T

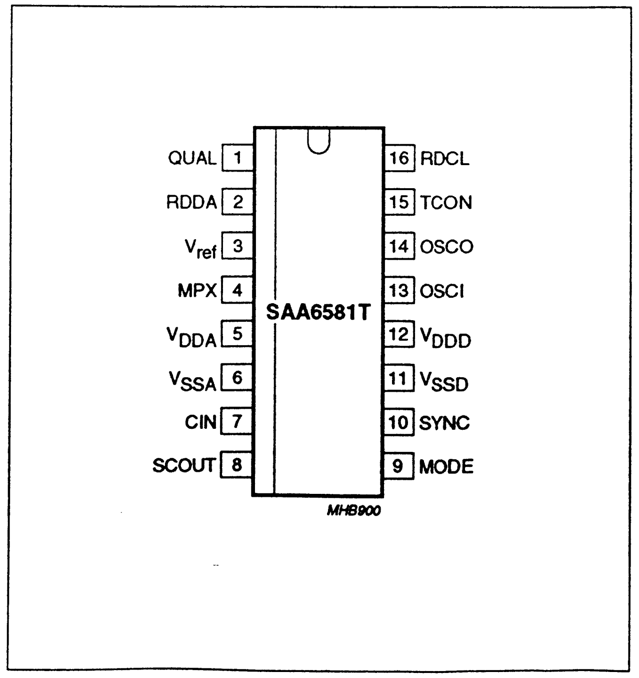
BLOCK DIAGRAM


560 pF
C6
SCOUT
CIN
8
7
+5 V
VDDD
12
C7
100 nF
10
SYNC
multiplex input
C1
330 pF
MPX
4
57 kHz
8th ORDER
BANDPASS FILTER
CLOCKED COMPARATOR
RDS/RBDS DEMODULATOR
16
RDCL
2
RDDA
SAA6581T
SIGNAL QUALITY DETECTOR
1
QUAL
+5 V
VDDA
5
C2
100 nF
POWER SUPPLY AND RESET
TEST CONTROL
OSCILLATOR AND CLOCK
6
3
15
9
13
14
11
VSSA
Vref
TCON
MODE
OSCI
OSCO
VSSD
C3
2.2 µF
C4
47 pF
Q1
C5
56 pF
MHB899

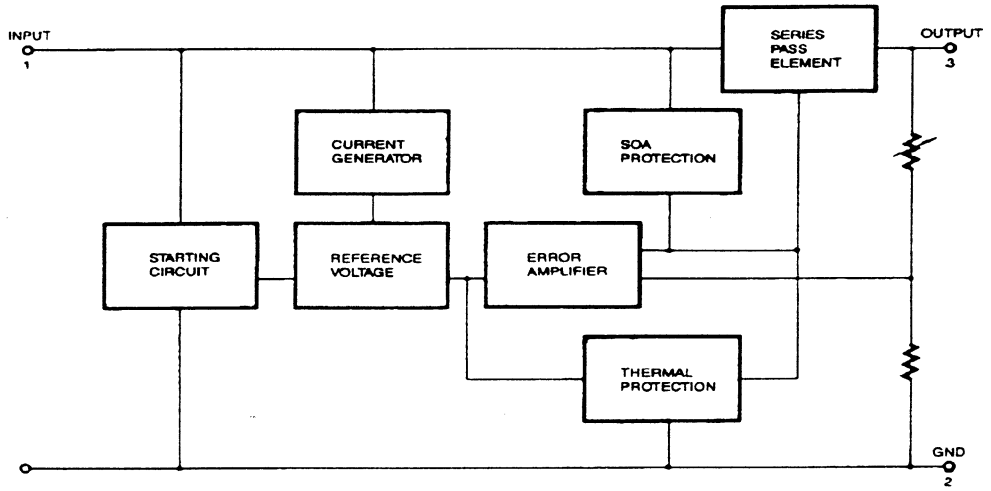
# PIN DESCRIPTION
# RDS/RBDS DEMODULATOR - IC SAA6581T

PINNING

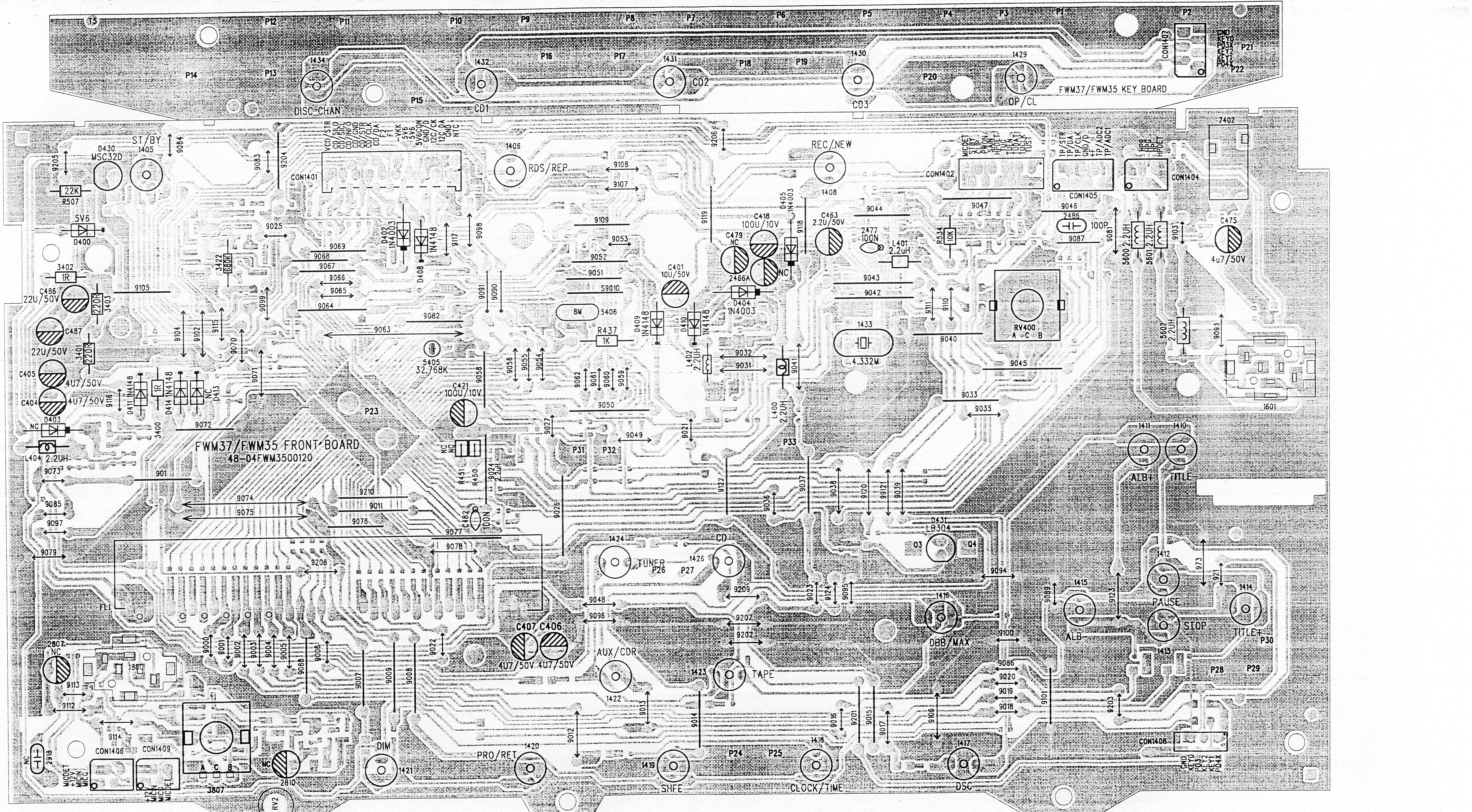
| SYMBOL | PIN | DESCRIPTION |
|---|---|---|
| QUAL | 1 | signal quality indication output |
| RDDA | 2 | RDS data output |
| $V_{ref}$ | 3 | reference voltage output ($^1/_2 V_{DDA}$) |
| MPX | 4 | multiplex signal input |
| $V_{DDA}$ | 5 | analog supply voltage (5 V) |
| $V_{SSA}$ | 6 | analog ground (0 V) |
| CIN | 7 | comparator input |
| SCOUT | 8 | switched capacitor filter output |
| MODE | 9 | oscillator frequency select input |
| SYNC | 10 | ARI clamping control input |
| $V_{SSD}$ | 11 | digital ground (0 V) |
| $V_{DDD}$ | 12 | digital supply voltage (5 V) |
| OSCI | 13 | oscillator input |
| OSCO | 14 | oscillator output |
| TCON | 15 | test control input |
| RDCL | 16 | RDS clock output |


QUAL 1
RDDA 2
Vref 3
MPX 4
VDDA 5
VSSA 6
CIN 7
SCOUT 8
SAA6581T
16 RDCL
15 TCON
14 OSCO
13 OSCI
12 VDDD
11 VSSD
10 SYNC
9 MODE
MHB900

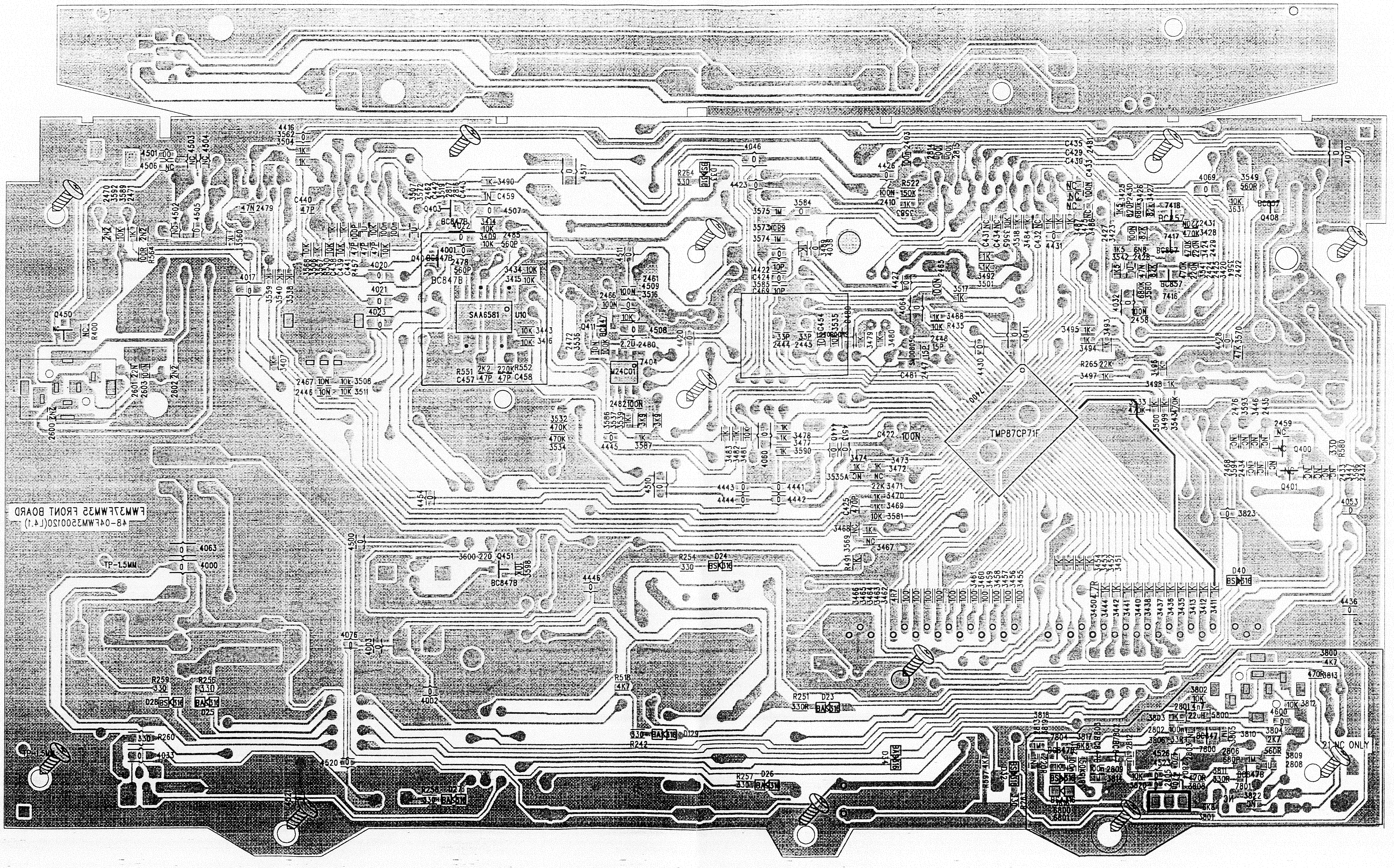
# INTERNAL BLOCK DIAGRAM
# POSITIVE VOLTAGE REGULATOR - IC KA7805


INPUT
1
SERIES PASS ELEMENT
OUTPUT
3
CURRENT GENERATOR
SOA PROTECTION
STARTING CIRCUIT
REFERENCE VOLTAGE
ERROR AMPLIFIER
THERMAL PROTECTION
GND
2

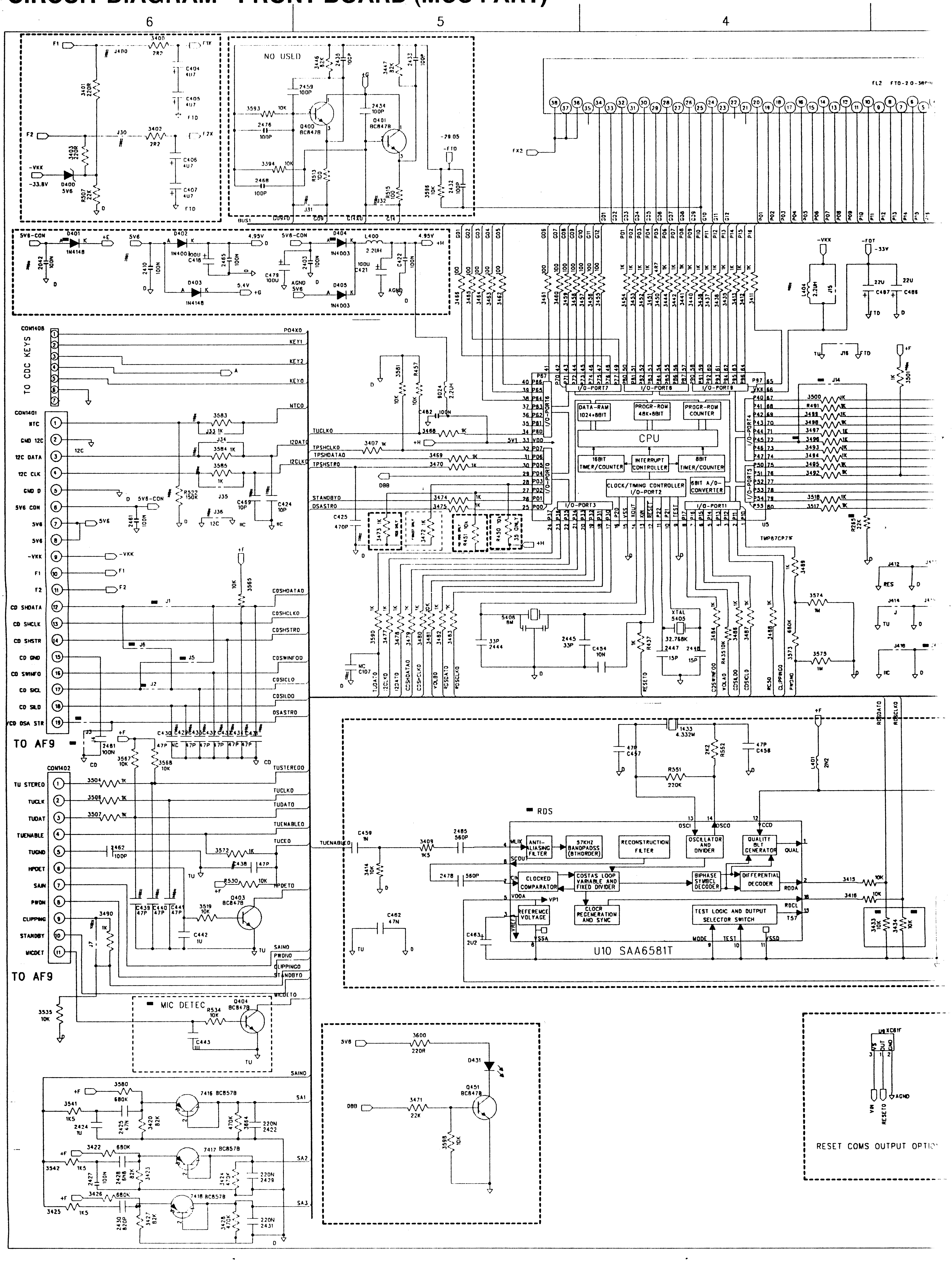
# PCB LAYOUT - FRONT & KEY BOARD (TOP VIEW)

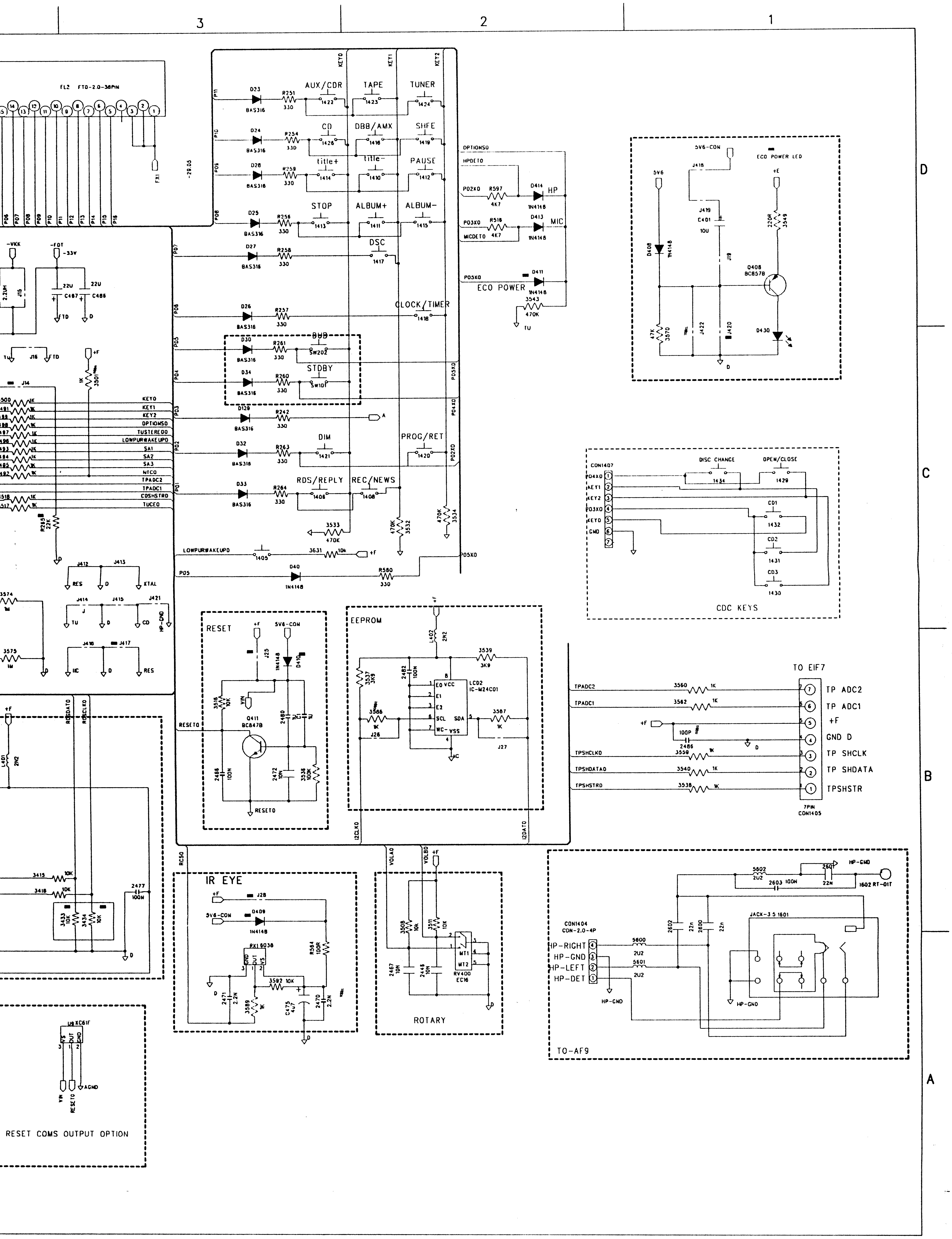

FWM37/FWM35 KEY BOARD
DISC CHAN
CD1
CD2
CD3
OP/CL
CON1407
GND
KEY0
P03X
KEY2
KEY1
P04X
FWM37/FWM35 FRONT BOARD
48-04FWM3500120
ST/BY
D430
MSC32D
R507
22K
5V6
D400
CON1401
RDS/REP
REC/NEW
CON1402
CON1405
CON1404
7402
D402
1N4003
D408
1N4148
C418
100U/10V
C479
NC
C463
2.2U/50V
2477
100N
L401
2.2uH
R534
10K
2486
100P
C475
4u7/50V
5600
5601
5602
2.2UH
C401
10U/50V
2466A
D404
1N4003
D405
1N4003
R437
1K
5406
8M
D409
1N4148
D410
1N4148
L402
2.2UH
L400
2.2UH
1433
4.332M
RV400
A C B
1601
5405
32.768K
C421
100U/10V
C486
22U/50V
C487
22U/50V
C405
4U7/50V
C404
4U7/50V
3402
1R
3422
680K
3403
220R
3401
220R
D411
D414
D413
1N4148
NC
D403
L404
2.2UH
R451
R450
C482
100N
FL1
TUNER
CD
AUX/CDR
TAPE
DBB/MAX
ALB+
TITLE-
ALB
PAUSE
STOP
TITLE+
D431
LB304
Q3
Q4
C407
C406
4U7/50V
2807
NC
CON1406
CON1409
MICDET
+12V
MICIN
MICG
3807
2810
RV2
2918
DIM
PRO/RET
SHFE
CLOCK/TIME
DSC
CON1408
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
P19
P20
P21
P22
P23
P24
P25
P26
P27
P28
P29
P30
P31
P32
P33

# PCB LAYOUT - FRONT & KEY BOARD (BOTTOM VIEW)

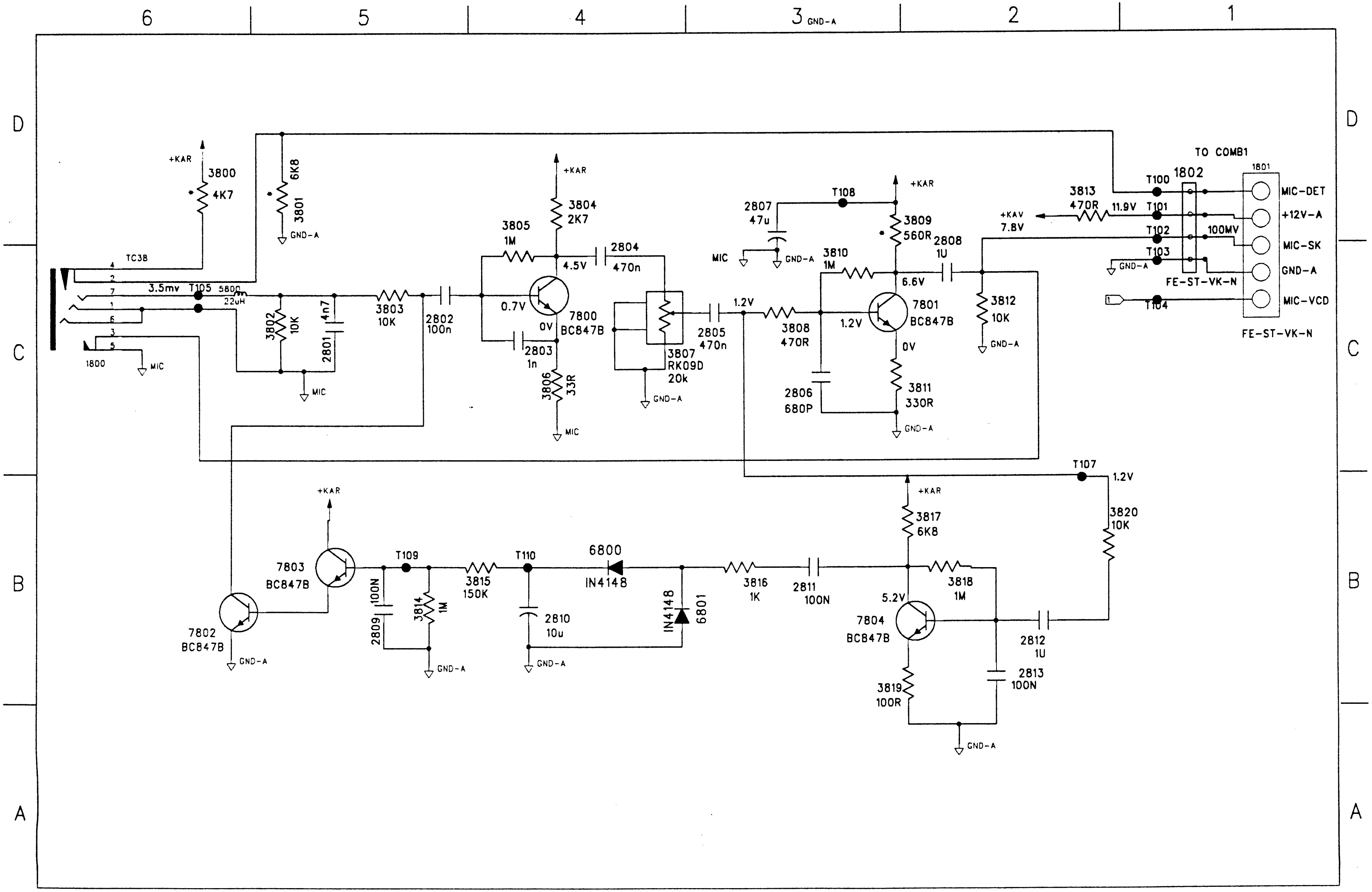

FWM37FWM35 FRONT BOARD
TMP87CP71F
SAA6581
U10
W24C01
BC847B
BC857
BC807
Q400
Q401
Q403
Q408
Q411
Q450
Q451
7404
7416
7417
7418
7801
TP-1.5MM
D23
D24
D25
D26
D28
D40
D129
BAS16
BSS16
R242
R251
R254
R256
R257
R258
R259
R260
R264
R265
R400
R435
R451
R518
R522
R551
R552
R564
R580
C425
C429
C430
C433
C435
C440
C457
C458
C459
C481
C486
C422
21 NC ONLY
TMP87CP71F

# CIRCUIT DIAGRAM - FRONT BOARD (MCU PART)


6
5
4
D
C
B
A
NO USED
FL2 FTD-20-38P
FX2
BUS1
5V6-CON
1N4148
1N4003
2.2UH
AGND
CON1408
TO CDC KEYS
PO4XO
KEY1
KEY2
KEY0
CON1401
NTC
GND 12C
12C DATA
12C CLK
GND D
5V6 CON
5V6
-VKK
F1
F2
CD SHDATA
CD SHCLK
CD SHSTR
CD GND
CD SWINFO
CD SICL
CD SILD
CD DSA STR
TO AF9
CON1402
TU STEREO
TUCLK
TUDAT
TUENABLE
TUGND
HPDET
SAIN
PWDN
CLIPPING
STANDBY
MICDET
TO AF9
MIC DETEC
TUCLKO
TPSHCLKO
TPSHDATAO
TPSHSTRO
STANDBYO
DSASTRO
I/O-PORT7
I/O-PORT8
I/O-PORT9
I/O-PORT6
I/O-PORT3
I/O-PORT2
I/O-PORT1
I/O-PORT4
I/O-PORT5
DATA-RAM 1024×8BIT
PROGR-ROM 48K×8BIT
PROGR-ROM COUNTER
CPU
16BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER I/O-PORT2
6BIT A/D-CONVERTER
U5
TMP87CP71F
XTAL 5405 32.768K
5408 8M
RES
RDS
ANTI-ALIASING FILTER
57KHZ BANDPASS (8THORDER)
RECONSTRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BLT GENERATOR
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
REFERENCE VOLTAGE
CLOCK REGENERATION AND SYNC
TEST LOGIC AND OUTPUT SELECTOR SWITCH
U10 SAA6581T
1433 4.332M
Q400 BC847B
Q401 BC847B
Q403 BC847B
Q404 BC847B
Q451 BC847B
D431
7416 BC857B
7417 BC857B
7418 BC857B
SAINO
SA1
SA2
SA3
U6 XC61F
VIN
RESETO
AGND
RESET COMS OUTPUT OPTIO


3
2
1
D
C
B
A
FL2 FTD-2.0-38PIN
FX1
-29.05
KEY0
KEY1
KEY2
AUX/CDR
TAPE
TUNER
CD
DBB/AMX
SHFE
title+
title-
PAUSE
STOP
ALBUM+
ALBUM-
DSC
CLOCK/TIMER
DUB
STDBY
DIM
PROG/RET
RDS/REPLY
REC/NEWS
BAS316
1N4148
OPTIONS0
HPDETO
P02XO
P03XO
MICDETO
P05XO
HP
MIC
ECO POWER
ECO POWER LED
5V6-CON
5V6
BC857B
LOWPUR/WAKEUPO
P05
-VKK
-FDT
-33V
KEY0
KEY1
KEY2
OPTIONS0
TUSTEREO0
LOWPUR/WAKEUPO
SA1
SA2
SA3
NTCO
TPADC2
TPADC1
CDSHSTRO
TUCEO
RES
XTAL
TU
CD
HP-GND
MC
CON1407
DISC CHANGE
OPEN/CLOSE
CD1
CD2
CD3
CDC KEYS
RESET
RESETO
BC847B
EEPROM
IC-M24C01
TO EIF7
TP ADC2
TP ADC1
+F
GND D
TP SHCLK
TP SHDATA
TPSHSTR
7PIN
CON1405
I2CLKO
I2DATO
RC5O
VOLAO
VOLBO
IR EYE
RX16038
ROTARY
RV400 EC16
CON1404
CON-2.0-4P
HP-RIGHT
HP-GND
HP-LEFT
HP-DET
JACK-3.5 1601
1602 RT-01T
TO-AF9
RDSDATO
RDSCLKO
XC61F
VIN
RESETO
AGND
RESET COMS OUTPUT OPTION

# CIRCUIT DIAGRAM - FRONT BOARD (MIC PART)


6
5
4
3 GND-A
2
1
D
C
B
A
+KAR
3800
4K7
6K8
3801
GND-A
TC38
3.5mv
T105
5800
22uH
1800
MIC
3802
10K
4n7
2801
3803
10K
2802
100n
3805
1M
3804
2K7
4.5V
2804
470n
0.7V
0V
7800
BC847B
2803
1n
3806
33R
3807
RK09D
20k
2805
470n
1.2V
2807
47u
T108
3809
560R
2808
1U
3810
1M
6.6V
3808
470R
7801
BC847B
2806
680P
3811
330R
3812
10K
3813
470R
11.9V
+KAV
7.8V
TO COMB1
1802
1801
T100
T101
T102
T103
T104
100MV
MIC-DET
+12V-A
MIC-SK
GND-A
MIC-VCD
FE-ST-VK-N
T107
1.2V
3817
6K8
3820
10K
7803
BC847B
7802
BC847B
T109
2809
100N
3814
1M
3815
150K
T110
2810
10u
6800
IN4148
6801
IN4148
3816
1K
2811
100N
5.2V
7804
BC847B
3818
1M
2812
1U
2813
100N
3819
100R

## ELECTRICAL PARTS - FRONT BOARD

| | | |
|---|---|---|
| 1800 | 9940 000 01325 | MICRO PHONE JACK D3.6 /21 |
| 1405 | 9940 000 01243 | TACT SWITCH |
| 1406 | 9940 000 01243 | TACT SWITCH |
| 1408 | 9940 000 01243 | TACT SWITCH |
| 1410 | 9940 000 01243 | TACT SWITCH |
| 1420 | 9940 000 01243 | TACT SWITCH |
| 1421 | 9940 000 01243 | TACT SWITCH |
| 1422 | 9940 000 01243 | TACT SWITCH |
| 1601 | 9940 000 01244 | V/PHONE JACK 3.5MM |
| 3807 | 9940 000 01324 | ROTARY VOLUME 20K /21 |
| 5406 | 9940 000 01242 | CER. RESONATOR 8.00M 2P |
| 7400 | 9940 000 01238 | IC TMP87PS71AF-QF80 /22 |
| 7400 | 9940 000 01339 | IC TMP87PS71F /21/30 |
| 7404 | 9940 000 01236 | IC M24C01-WMN6 |
| D430 | 9940 000 01233 | LED LAMP (MICRO)(RED) |
| D431 | 9940 000 01234 | LED LAMP 3MM (RED) |
| FL1 | 9940 000 01235 | FTD DISPLAY VFD70-1201FN |
| L600 | 9940 000 01211 | TOROID COIL 180UH 10TX2 |
| RV400 | 9940 000 01241 | ROTARY ENCODER |
| U10 | 9352 686 05118 | IC SM SAA6581T |
| | 9940 000 01239 | OPTIC SENSER |

**Note:** **Only these parts mentioned in the list are normal service parts.**

# MAIN BOARD

**TABLE OF CONTENTS**

Brief of Introduction of Main Board .................................. 6-1
Internal IC Diagram .................................................... 6-2
PCB Layout Top View /21 ................................................ 6-3
PCB Layout Bottom View /21 .......................................... 6-4
Circuit Diagram - Amp Part ............................................. 6-5
PCB Layout Top View /22 ................................................ 6-6
PCB Layout Bottom View /22 .......................................... 6-7
Electrical Parts list ........................................................ 6-8

## *BRIEF INTRODUCTION OF THE MAIN BOARD*

The Main Board consists of the following features :

a. TDA7468D

TDA7468D (IC704) provides the basic sound processing - loudness, bass, treble, volume & mute controls and source selection TUNER, TAPE, CD & AUX including Mic mixing for the set.
Sound features such as ALC, DBB, DSC and IS are controlled by the microprocessor IC on the Front Board via $I^2C$ Bus.
Undesirable noise during source switching are muted off by via the software of the microprocessor IC on the Front Board.

b. TDA8947J

The TDA8947J contains a unique protection circuit that is solely based on multiple temperature measurements inside the chip. This gives maximum output power for all supply voltages and load conditions with no unnecessary audio holes. Almost any supply voltage and load impedance combination can be made as long as thermal boundary conditions (number of channels used, external heatsink and ambient temperature) allow it.

c. MIC MIXING

Simple Mic mixing is provided by pin 2 of TDA7468D. During Mic mixed a 1nF capacitor is connected across this pin to ground instead of a chip connector(0R).

d. HEADPHONE AMPLIFIER

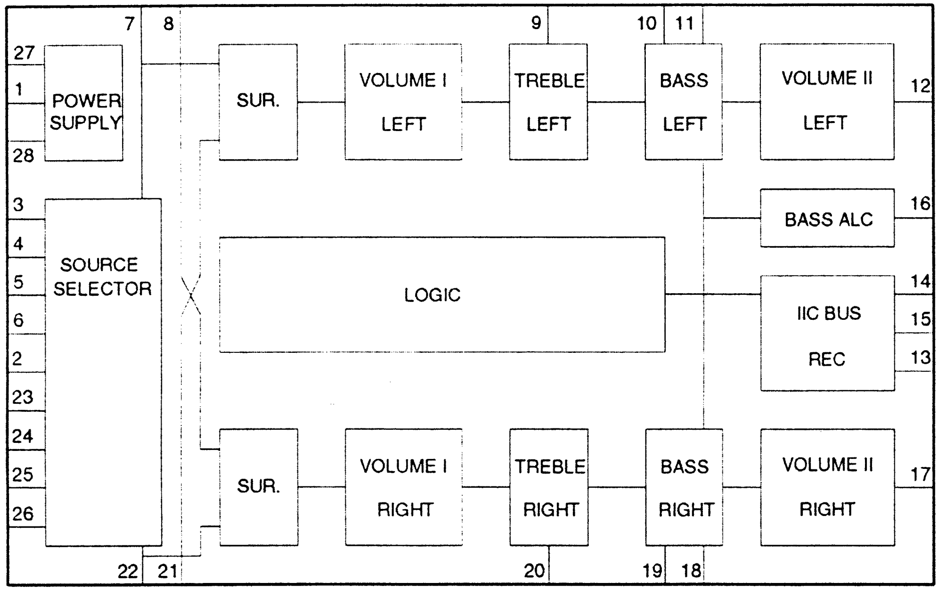
Headphone amplifier NJM4556AM is provided after the Sound processor to drive 32 ohm to 1kohm headphone.

Remark: 1) For ECO6 Tuner Part built in Main Board, refer to Chapter 7A & Chapter 7B.

2) For Ver 22, whole Main Board Ass'y can be ordered with 12nc: 9940 000 01506.

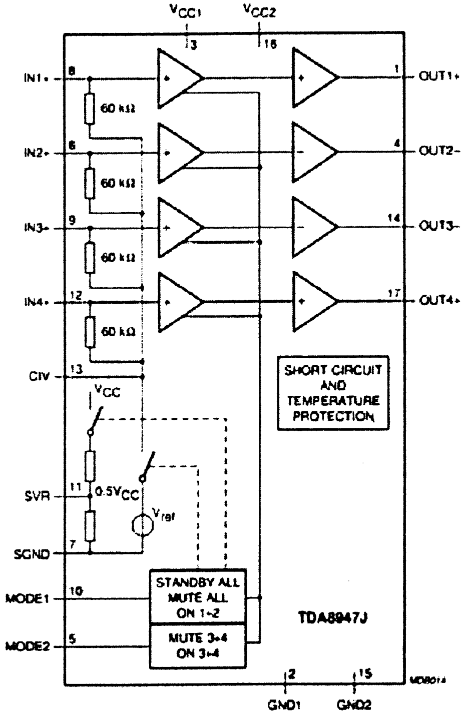
# INTERNAL BLOCK DIAGRAM
# IC TDA7468D

**TDA7468**


7
8
9
10
11
27
1
28
POWER SUPPLY
SUR.
VOLUME I LEFT
TREBLE LEFT
BASS LEFT
VOLUME II LEFT
12
3
4
5
6
2
23
24
25
26
SOURCE SELECTOR
BASS ALC
16
LOGIC
IIC BUS REC
14
15
13
SUR.
VOLUME I RIGHT
TREBLE RIGHT
BASS RIGHT
VOLUME II RIGHT
17
22
21
20
19
18

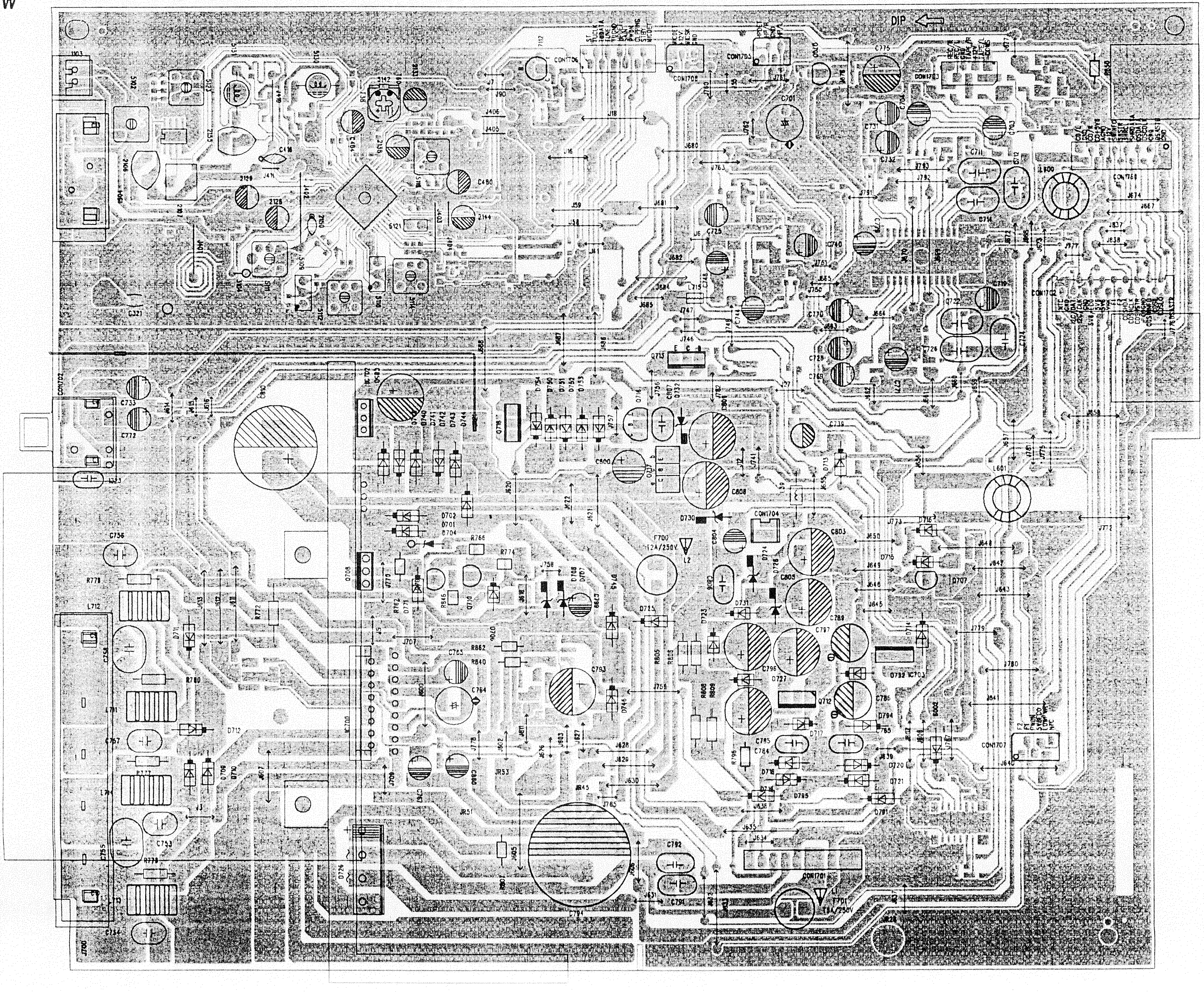
---

# INTERNAL BLOCK DIAGRAM
# IC TDA8947J 4-CHANNEL AUDIO AMPLIFIER

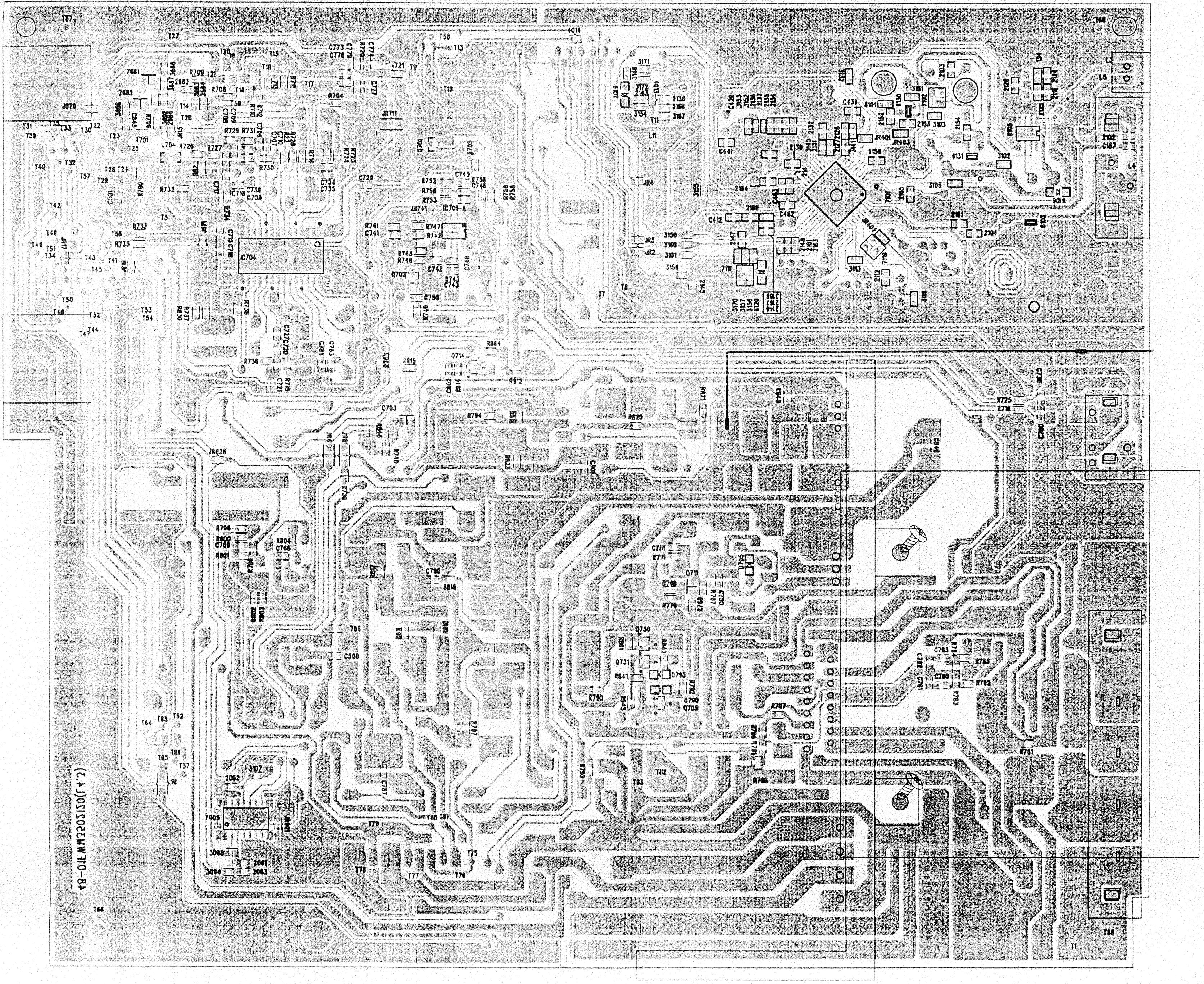

VCC1
VCC2
3
16
IN1+
8
60 kΩ
1
OUT1+
IN2+
6
60 kΩ
4
OUT2-
IN3+
9
60 kΩ
14
OUT3-
IN4+
12
60 kΩ
17
OUT4+
CIV
13
VCC
SHORT CIRCUIT AND TEMPERATURE PROTECTION
SVR
11
0.5VCC
Vref
SGND
7
MODE1
10
STANDBY ALL
MUTE ALL
ON 1+2
TDA8947J
MODE2
5
MUTE 3+4
ON 3+4
2
15
GND1
GND2
MDB014

## PCB LAYOUT - MAIN BOARD_for /21/30

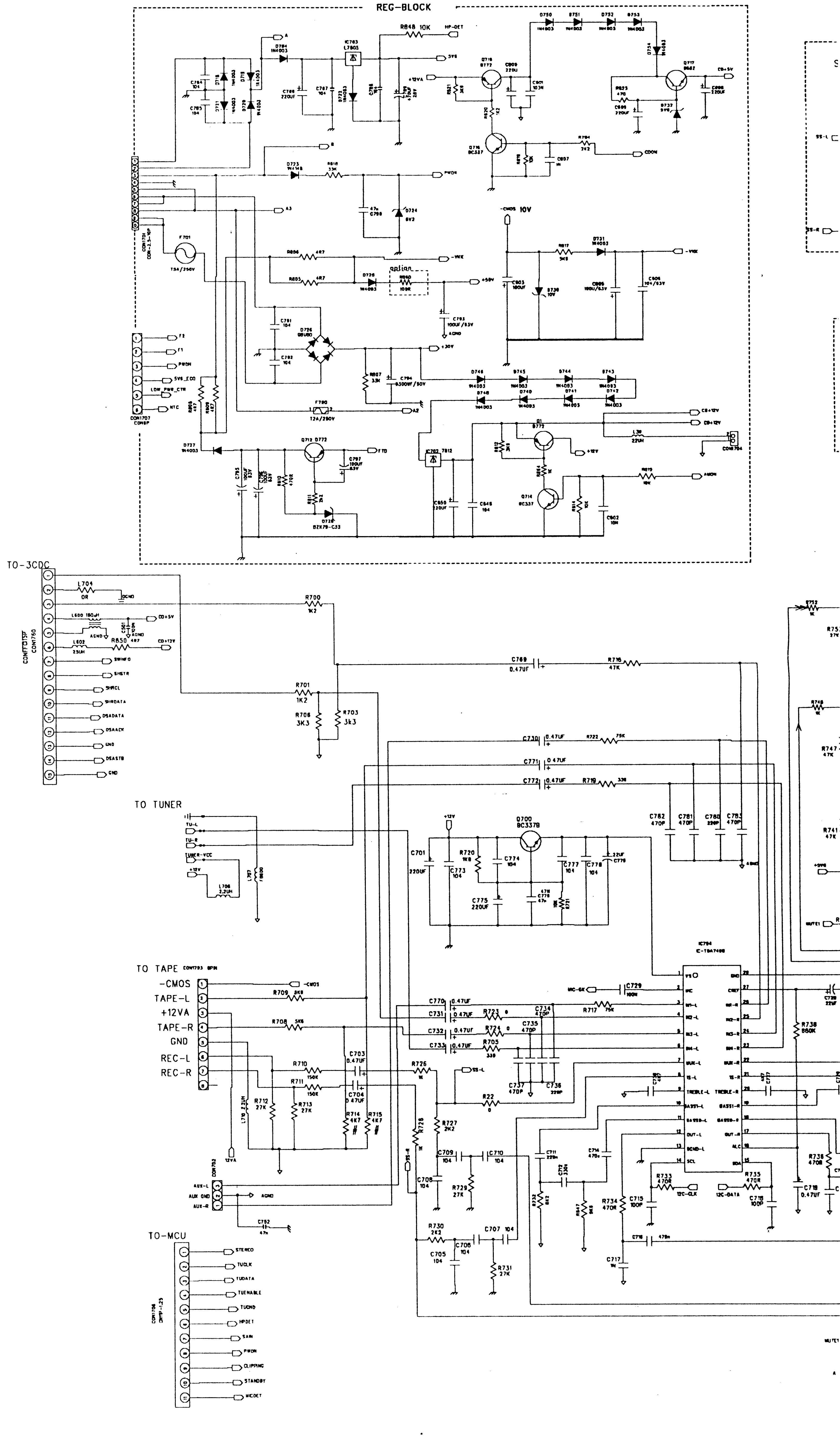
*TOP VIEW*

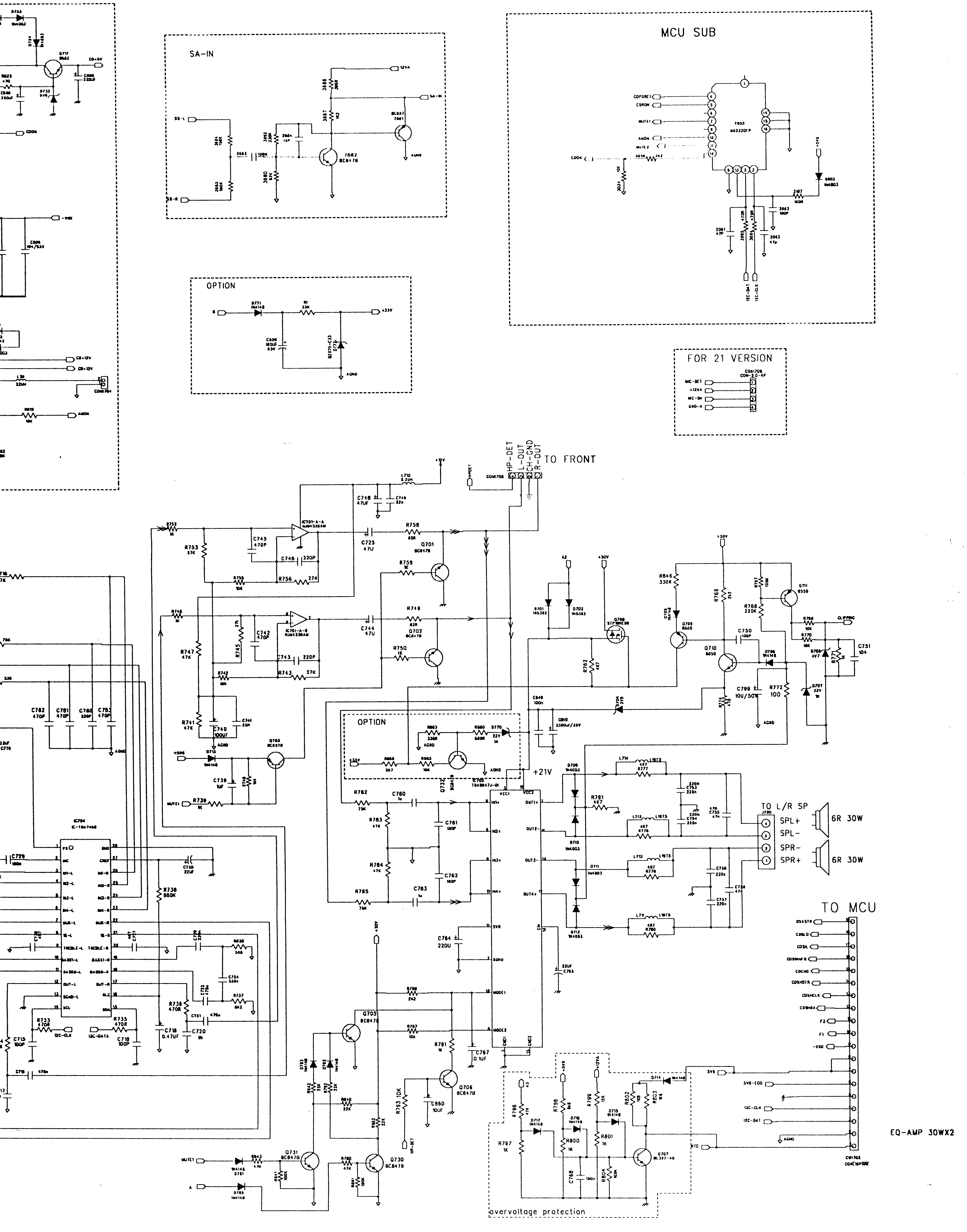

DIP
CON1706
CON1705
CON1702
CON1703
CON1760
CON1704
CON1707
CON1701
C775
C701
C731
C732
C711
C740
C725
C770
C728
C769
C735
C733
C772
C756
C758
C757
C753
C754
C763
C764
C793
C789
C797
C796
C785
C784
C786
C792
C791
C794
C803
C805
C808
C800
C480
C416
C321
L601
L712
L791
L794
F700
T2A/250V
F701
T4A/250V
IC700
IC701
Q708
Q712
Q715
R766
R774
R778
R779
R780
R862
R840
R805
R808
R809
R798
D730
D731
D715
D716
D717
D718
D719
D720
D721
D712
D711
D704
D701
D702
D750
D751
D752
D753
D754
J774
J772
J779
J780
J841
J840
J643
J645
J646
J647
J648
J649
J650
J658
J667
J674
J680
J681
J682
J684
J685
J686
J687
J688
J763
J746
J747
J759
J765
J628
J629
J630
J631
J634
J635
J636
J405
J406
J411
J700
J707
JR51
JR53
S112
S113
S121
S142
5100
5101
5102
1103
1904
2106
2120
2128
2144
2510

# PCB LAYOUT - MAIN BOARD_for /21/30
## BOTTOM VIEW


T87
T27
T56
T13
T9
T10
4014
T68
3171
L11
L6
L4
IC704
IC701-A
Q702
Q703
Q714
Q711
Q730
Q731
Q703
Q705
Q706
D705
R812
R815
R820
R844
C500
C501
C441
C412
C431
C482
7605
3069
3094
3102
2062
2061
2063
T75
T76
T77
T78
T79
T80
T81
T82
T83
T61
T62
T63
T64
T65
T66
T37
T1
T7
T8
R761
R762
R763
R775
R776

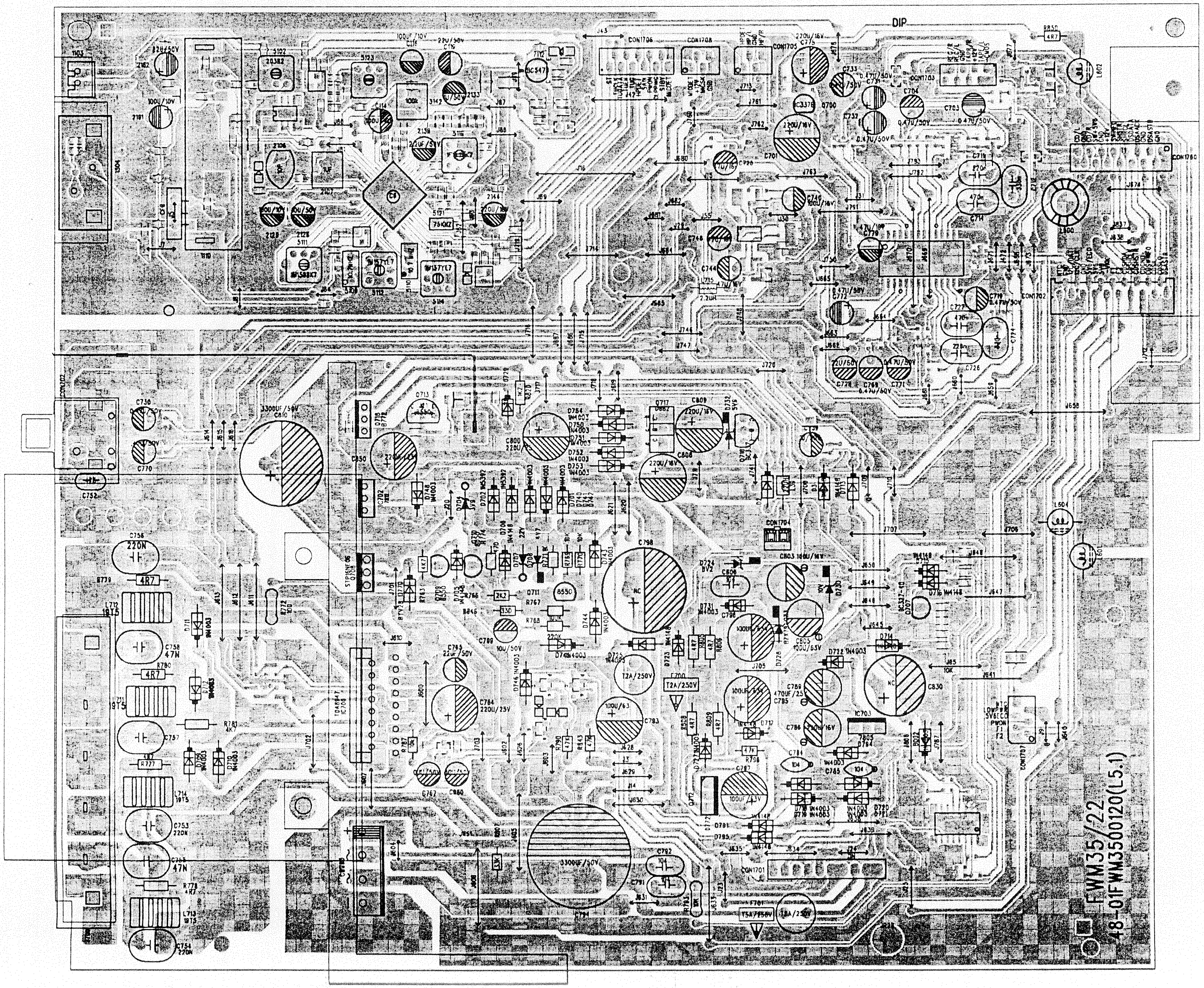
# CIRCUIT DIAGRAM - MAIN BOARD
# AMP PART


REG-BLOCK
R848 10K
HP-DET
IC703 L7805
D704 1N4003
5V6
+12VA
CD+5V
C784 104
C785 104
D750
D751
D752
D753
1N4003
Q716 B772
Q717 B682
Q716 BC337
CDON
D723 1N4148
R818 33K
PWDN
C798 47u
D724 8V2
A3
CON1701
F701
T3A/250V
R806 4R7
R805 4R7
D726 1N4003
option
R860 100R
+50V
C793 100UF/63V
AGND
-CMOS 10V
R817 5K6
D731 1N4003
-VKK
C803 100UF
D738 10V
C805 100U/63V
C806 104/63V
C781 104
D726 GBU8D
C782 104
+30V
R807 33K
C794 6300UF/50V
D746 D745 D744 D743
D748 D740 D741 D742
1N4003
F1
F2
PWDN
5V6_ECO
LOW_PWR_CTR
NTC
CON1707 CON6P
R808 4R7
R809 4R7
F700 T2A/250V
A2
CD+12V
CD+12V
Q1 B772
+12V
L30 22UH
CON1704
IC702 7812
D727 1N4003
Q712 D772
FTD
C797 100UF 63V
C795
C796
R810 470R
R811 2K2
D728 BZX79-C33
C859 220UF
C846 104
Q714 BC337
R814 10K
R819 10K
AMON
C902 10N
TO-3CDC
L704 0R
DGND
R700 1K2
L600 180uH
AGND
CD+5V
L602 22UH
R850 4R7
CD+12V
CONFFD15P CON1750
SWINFO
SWSTR
SWRCL
SWRDATA
DSADATA
DSAACK
GND
DSASTB
GND
C769 0.47UF
R716 47K
R701 1K2
R706 3K3
R703 3k3
C730 0.47UF
R722 75K
C771 0.47UF
C772 0.47UF
R719 33K
TO TUNER
TU-L
TU-R
TUNER-VCC
+12V
L706 2.2UH
L707 FB800
+12V
Q700 BC337B
C701 220UF
R720 1K8
C773 104
C774 104
C775 220UF
C777 104
C778 104
C779 22UF
R721 1K
C776 47u
C782 470P
C781 470P
C780 220P
C783 470P
IC704 IC-TDA7468
TO TAPE CON1703 8PIN
-CMOS
TAPE-L
+12VA
TAPE-R
GND
REC-L
REC-R
R709 5K6
-CMOS
R708 5K6
C770 0.47UF
C731 0.47UF
R723 0
C734 470P
C732 0.47UF
R724 0
C735 470P
C733 0.47UF
R705 330
C737 470P
C736 220P
C729 100N
MIC-SK
R717 75K
R710 150K
R711 150K
C703 0.47UF
C704 0.47UF
R726 1K
SS-L
R22 0
R712 27K
R713 27K
R714 4K7
R715 4K7
L710 2.2UH
R725 1K
R727 2K2
C709 104
C710 104
C708 104
R729 27K
12VA
CON702
AUX-L
AUX GND
AUX-R
AGND
C752 47n
R730 2K2
C707 104
C705 104
C706 104
R731 27K
C711 220n
C712 330n
C714 470n
R732 8K2
R647 8K2
R734 470R
C715 100P
C716 470n
C717 1N
R733 470R
I2C-CLK
R735 470R
I2C-DATA
C715 100P
C718 0.47UF
R736 470R
R738 860K
C739 22UF
R752 1K
R753 27K
R746 1K
R747 47K
R741 47K
MUTE1
SS-L
SS-R
TO-MCU
CON1706
STEREO
TUCLK
TUDATA
TUENABLE
TUCHD
HPDET
SAIN
PWDN
CLIPPING
STANDBY
MICDET
VS
MIC
IN1-L
IN2-L
IN3-L
IN4-L
MUX-L
TS-L
TREBLE-L
BASS1-L
BASS0-L
OUT-L
SCND-L
SCL
GND
CREF
IN1-R
IN2-R
IN3-R
IN4-R
MUX-R
TS-R
TREBLE-R
BASS1-R
BASS0-R
OUT-R
ALC
SDA

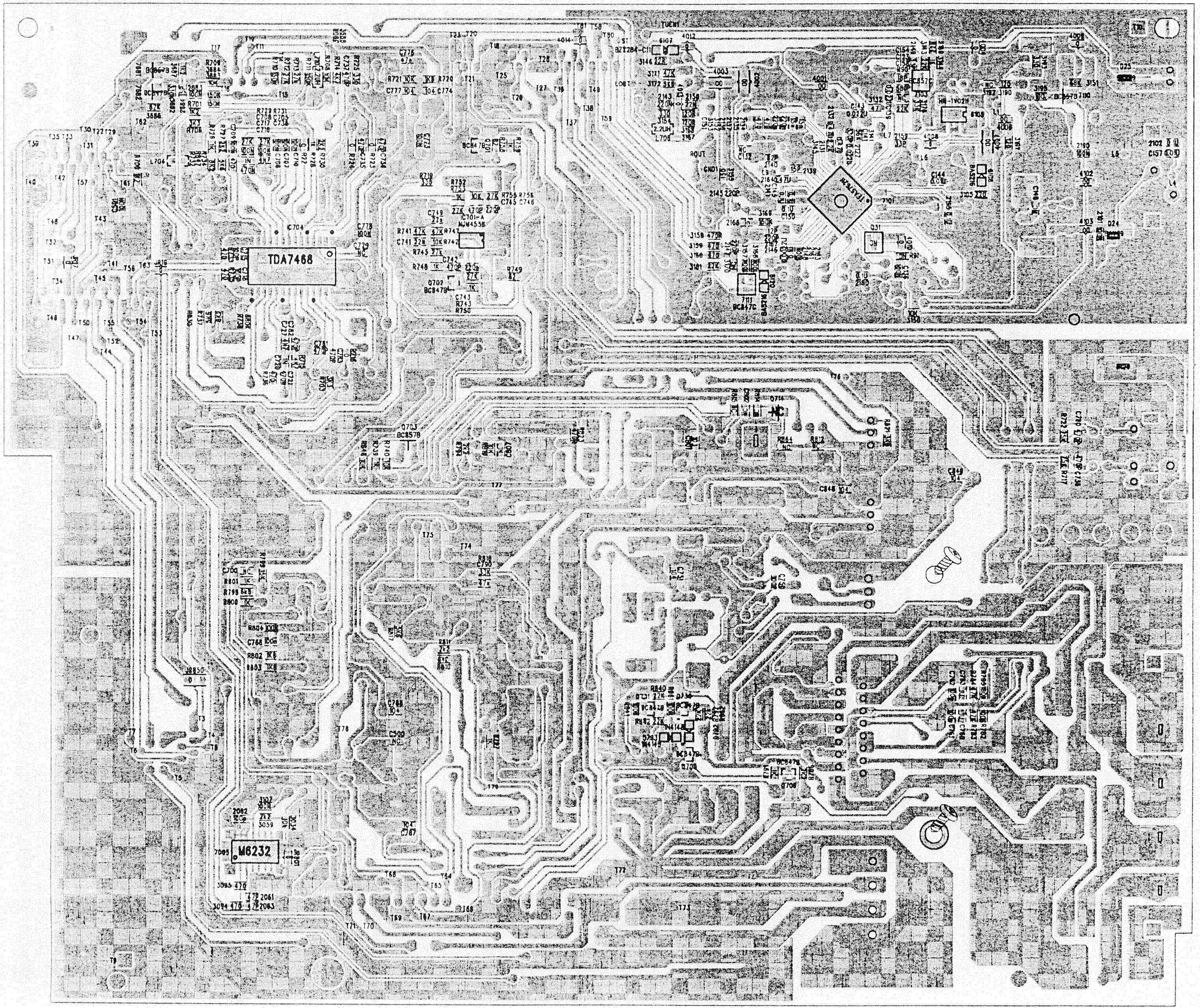

SA-IN
OPTION
MCU SUB
FOR 21 VERSION
HP-DET
L-OUT
CH-GND
R-OUT
TO FRONT
+21V
TO L/R SP
SPL+
SPL-
SPR-
SPR+
6R 30W
6R 30W
TO MCU
overvoltage protection
EQ-AMP 30WX2
IC701-A-A NJM4558M
IC701-A-B NJM4558M
IC704 IC-TDA7460
IC700 TDA8947J
Q701 BC847B
Q702 BC847B
Q703 BC857B
Q705 BC847B
Q706 BC847B
Q707 BC327-40
Q708 8550
Q710 8050
Q711 8550
Q730 BC847B
Q731 BC847B
R752 1K
R753 27K
C745 470P
C746 220P
R756 27K
R755 10K
C725 47U
R758 82R
R759 1K
C744 47U
R749 82R
R750 1K
R747 47K
R745 27K
C742 470P
C743 220P
R743 27K
R742 10K
R741 47K
C740 100UF
C741 22N
C739 1UF
R739 1K
MUTE1
C748 47UF
L713 2.2UH
R782 75K
C760
R783 47K
C761 100P
R784 47K
C762 100P
R785 75K
C763
C764 220U
R786 2K2
R787 10K
R791 1K
C767 0.1UF
R783 10K
C860 10UF
HP-DET
R840 22K
R842 22K
R843 4K7
R841 100K
R780 47K
R861 100K
MUTE1
R846 330R
R768 2K2
R757 10K
R768 220K
C750 100P
C799 10U/50V
R772 100
R762 4K7
C848 100N
C810 3300uF/35V
D709 1N4003
D710 1N4003
D711 1N4003
D712 1N4003
R781 4K7
L714 L712 L715 L711
C753 220N
C754 220N
C755 47N
C756 220N
C757 220N
C758 47N
R777 4R7
R778 4R7
R779 4R7
R780 4R7
C782 470P
C781 470P
C780 330P
C783 470P
R738 680K
R736 470R
C718 0.47UF
C720 1N
R733 470R
R735 470R
C715 100P
C716 100P
C729 100N
C738 22UF
I2C-CLK
I2C-DATA
R796
R797 1K
R798
R800 1K
R799
R801 1K
R802
R803
R804 10K
C768
D714 1N4148
D715 1N4148
D716 1N4148
D717 1N4148
+12VA
+30V
+33V
CLIPPROC
AGND
7803 M62320FP
3688 390R
3687 1K2
7687 BC847B
7681 BC857
SS-L
SS-R
SA-IN
12VA
D771 1N4148
R1 33K
C820 100UF 63V
BZX79-C33 D772
MIC-DET
+12VA
MIC-SW
GND-A
CON1706
DSASTB
CDSLD
CDSIL
CDSWAKE
CDCMD
CDSHSTR
CDSHCLK
CDSHBA
F2
F1
-VKK
5V6
5V6-ECO
I2C-CLK
I2C-DAT
RTC
CN1702

# PCB LAYOUT - MAIN BOARD_for /22 (9940 000 01506)

## TOP VIEW


DIP
FWM35/22
48-01FWM350120(L5.1)
CON1701
CON1702
CON1703
CON1704
CON1705
CON1706
CON1708
C798
C830
C810
3300UF/50V

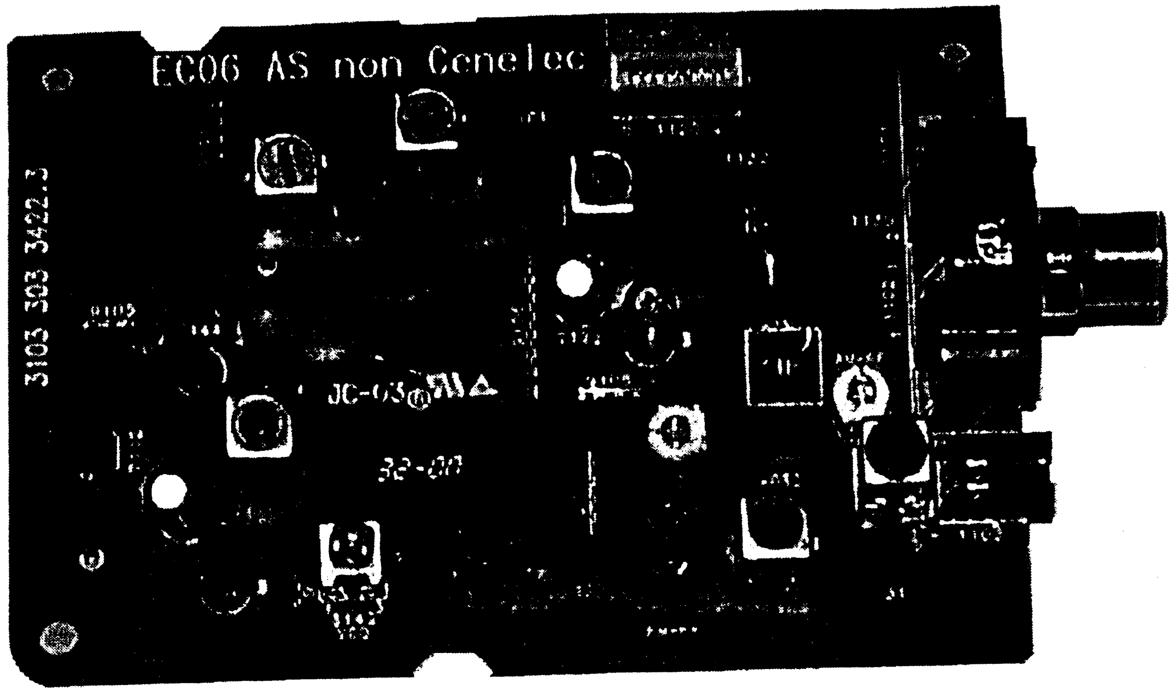
## PCB LAYOUT - MAIN BOARD_for /22 (9940 000 01506)
## BOTTOM VIEW


TDA7468
M6232
TDA7479

## *ELECTRICAL PARTS - MAIN BOARD*

| | | |
|---|---|---|
| 1110 | 9940 000 00256 | TUNER (MITSUMI) FE450-G01 |
| 1504 | 9940 000 01218 | COAXIAL JACK HIR-401V |
| 2106 | 9940 000 01207 | TRIMMER 10PF 6MM (WH) |
| 5102 | 9940 000 01212 | AM IFT (BLACK) 7MM |
| 5109 | 9940 000 01208 | CER. FILTER |
| 5110 | 9940 000 01208 | CER. FILTER |
| 5111 | 9940 000 01213 | AM IFT 7MM (BLACK) |
| 5112 | 9940 000 01215 | AM IFT 7MM (YELLOW) |
| 5114 | 9940 000 01215 | AM IFT 7MM (YELLOW) |
| 5119 | 9940 000 01214 | FM IFT 7MM (BLACK) |
| 5123 | 9940 000 01216 | AM OSC 7MM (BROWN) |
| 7005 | 4822 209 17345 | M62320FP |
| 7101 | 9351 740 80557 | IC TEA5757H/V1 /21 |
| 7101 | 9351 772 20557 | IC SM TEA5762H/V1 |
| C794 | 9940 000 01206 | E.CAP 3300UF 50V +/-20% |
| C810 | 9940 000 01205 | E.CAP 3300UF 35V +/-20% |
| CON702 | 9940 000 01221 | V/RCA JACK 2P |
| D726 | 4822 130 11139 | GBU8D |
| F700 ⚠ | 9940 000 01222 | FUSE RADIAL LT 2A 250V |
| F701 ⚠ | 9940 000 01223 | FUSE RADIAL T5A 250V |
| IC700 | 9940 000 01203 | IC TDA8947J/N3 |
| IC701 | 5322 209 15853 | IC NJM4556AM |
| IC702 | 4822 209 90087 | IC KA7812 |
| IC703 | 9965 000 14344 | IC KA7805 |
| IC704 | 9322 150 74668 | IC TDA7468D |
| J700 | 9940 000 01219 | SPK JACK (RD/BLK/BLK/RD) |
| L602 | 9940 000 01209 | TOROID COIL 25µH |
| L711 | 9940 000 01217 | AIR COIL 6X18.5T (0.5MM) |
| L712 | 9940 000 01217 | AIR COIL 6X18.5T (0.5MM) |
| L713 | 9940 000 01217 | AIR COIL 6X18.5T (0.5MM) |
| L714 | 9940 000 01217 | AIR COIL 6X18.5T (0.5MM) |
| Q708 | 4822 130 11336 | STP16NF06FP |
| Q712 | 9940 000 01193 | TRANSISTORS KSB772YS |
| Q717 | 9940 000 01194 | TRANSISTORS KSD882Y |
| Q718 | 9940 000 01193 | TRANSISTORS KSB772YS |
| | 9940 000 01322 | COAXIAL JACK /21 |

**Note: Only these parts mentioned in the list are normal service parts.**


ECO6 AS non Cenelec
3103 303 3422.3

# ECO6 Tuner Part

version: ***SYSTEMS non-CENELEC***

**TABLE OF CONTENTS**

Blockdiagram ........................................................................7A-1
Schematic Diagram.................................................................7A-2
Component Layout..................................................................7A-3
Adjustment table ....................................................................7A-3
Electrical Partslist....................................................................7A-4

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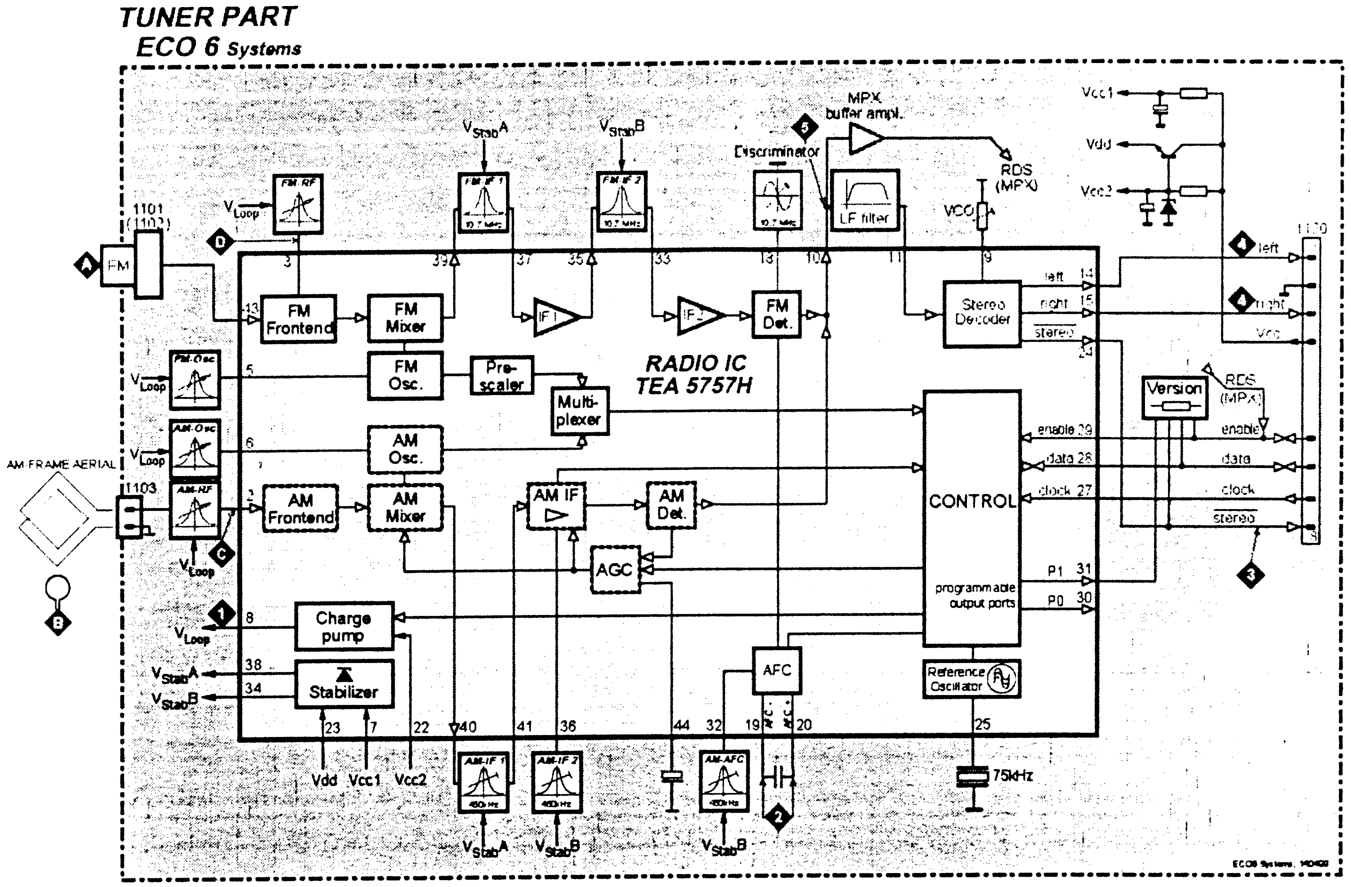
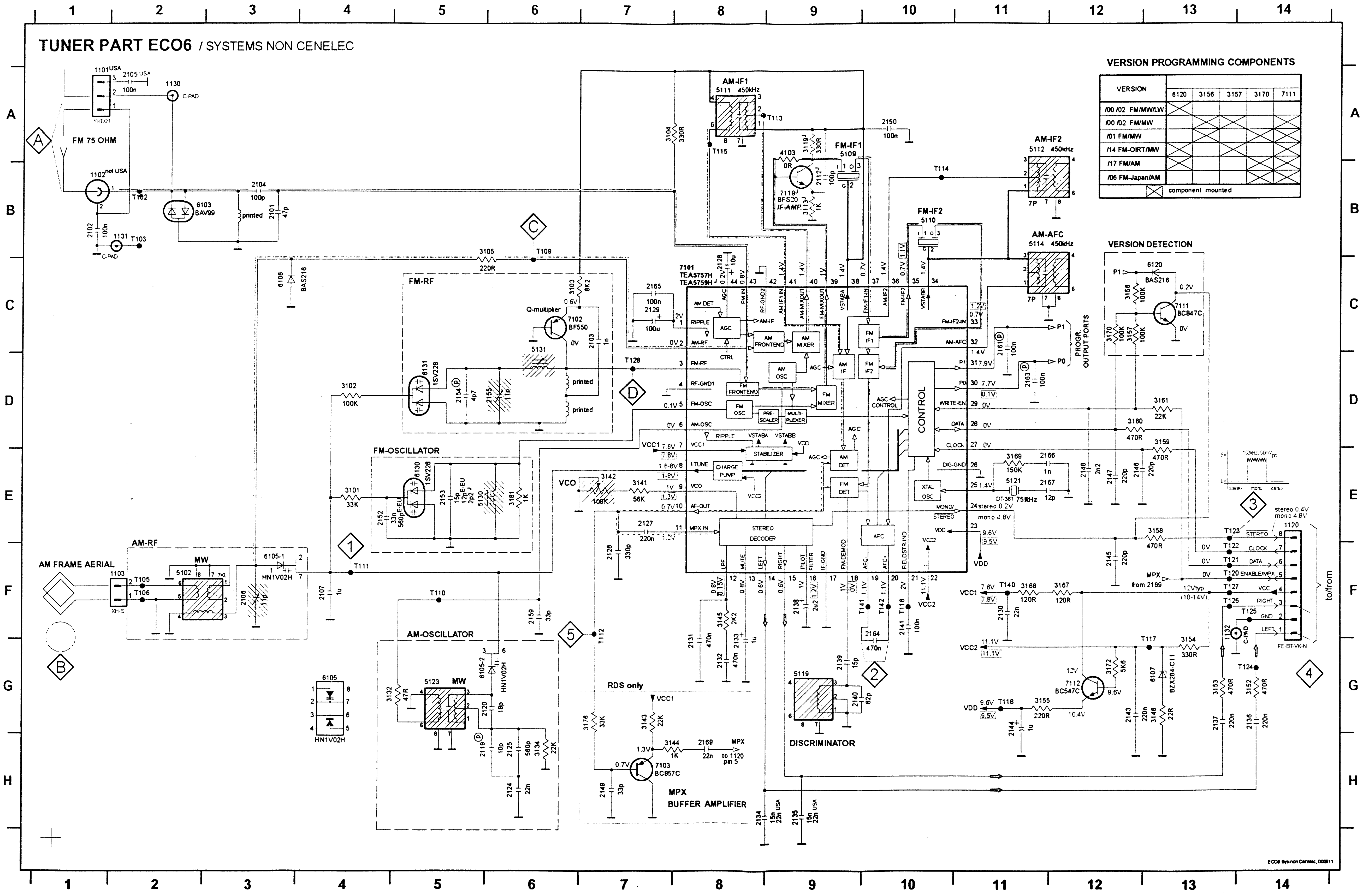
## BLOCK DIAGRAM


TUNER PART
ECO 6 Systems
FM
1101
1103
AM FRAME AERIAL
FM RF
FM-Osc
AM-Osc
AM-RF
FM IF 1
FM IF 2
Discriminator
MPX buffer ampl.
RDS (MPX)
VCO
Vcc1
Vdd
Vcc2
FM Frontend
FM Mixer
IF1
IF2
FM Det.
LF filter
Stereo Decoder
left
right
stereo
RADIO IC
TEA 5757H
FM Osc.
Pre-scaler
Multi-plexer
AM Osc.
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
CONTROL
enable
data
clock
Version
programmable output ports
P1
P0
Charge pump
Stabilizer
AFC
Reference Oscillator
AM-IF 1
AM-IF 2
AM-AFC
75kHz
Vdd
Vcc1
Vcc2
1170

## TUNER PART ECO6 / SYSTEMS NON CENELEC


FM 75 OHM
AM FRAME AERIAL
AM-RF
FM-RF
FM-OSCILLATOR
AM-OSCILLATOR
AM-IF1
AM-IF2
AM-AFC
FM-IF1
FM-IF2
7101 TEA5757H TEA5759H
7119 BFS20 IF-AMP.
7102 BF550
Q-multiplier
VCO
STABILIZER
CHARGE PUMP
STEREO DECODER
CONTROL
XTAL OSC
AFC
DISCRIMINATOR
RDS only
7103 BC857C
MPX BUFFER AMPLIFIER
VERSION DETECTION
7111 BC847C
7112 BC547C
PROGR OUTPUT PORTS
1120
FE-BT-VK-N
to/from
STEREO
CLOCK
DATA
ENABLE/MPX
VCC
RIGHT
GND
LEFT
VCC1
VCC2
VDD
ECO6 Sys-non Cenelec, 000911

### VERSION PROGRAMMING COMPONENTS

| VERSION | 6120 | 3156 | 3157 | 3170 | 7111 |
|---|---|---|---|---|---|
| /00 /02 FM/MW/LW | ☒ | | | | |
| /00 /02 FM/MW | | ☒ | ☒ | | ☒ |
| /01 FM/MW | | ☒ | | ☒ | ☒ |
| /14 FM-OIRT/MW | ☒ | | ☒ | | ☒ |
| /17 FM/AM | ☒ | | | ☒ | ☒ |
| /06 FM-Japan/AM | | | | ☒ | ☒ |

☒ component mounted

| | |
|---|---|
| 1101 | A1 |
| 1102 | B1 |
| 1103 | F2 |
| 1120 | E14 |
| 1130 | A2 |
| 1131 | B2 |
| 1132 | G13 |
| 2101 | B3 |
| 2102 | B1 |
| 2103 | C7 |
| 2104 | B3 |
| 2105 | A2 |
| 2106 | F3 |
| 2107 | F4 |
| 2119 | H6 |
| 2120 | G6 |
| 2124 | H6 |
| 2125 | H6 |
| 2126 | F7 |
| 2127 | E7 |
| 2128 | C8 |
| 2129 | C7 |
| 2130 | F11 |
| 2131 | G8 |
| 2132 | G8 |
| 2133 | G8 |
| 2134 | H8 |
| 2135 | H9 |
| 2136 | G14 |
| 2137 | G13 |
| 2138 | F9 |
| 2139 | G9 |
| 2140 | G9 |
| 2141 | F10 |
| 2143 | G12 |
| 2144 | G11 |
| 2145 | F12 |
| 2146 | E12 |
| 2147 | E12 |
| 2148 | E12 |
| 2149 | H7 |
| 2150 | A10 |
| 2152 | E4 |
| 2153 | E5 |
| 2154 | D5 |
| 2155 | D5 |
| 2159 | F6 |
| 2161 | C11 |
| 2163 | D11 |
| 2164 | F10 |
| 2165 | C7 |
| 2166 | E11 |
| 2167 | E11 |
| 2169 | H8 |
| 3101 | E4 |
| 3102 | D4 |
| 3103 | C6 |
| 3104 | A7 |
| 3105 | B6 |
| 3132 | G5 |
| 3134 | H6 |
| 3141 | E7 |
| 3142 | E7 |
| 3143 | G7 |
| 3144 | H7 |
| 3145 | F8 |
| 3146 | G13 |
| 3152 | G14 |
| 3153 | G13 |
| 3154 | G13 |
| 3155 | G11 |
| 3156 | C12 |
| 3157 | C12 |
| 3158 | E13 |
| 3159 | D13 |
| 3160 | D12 |
| 3161 | D13 |
| 3167 | F12 |
| 3168 | F11 |
| 3169 | E11 |
| 3170 | C12 |
| 3172 | G12 |
| 3176 | G7 |
| 3181 | E6 |
| 5102 | F2 |
| 5109 | B9 |
| 5110 | B10 |
| 5111 | A8 |
| 5112 | A11 |
| 5114 | B11 |
| 5119 | G9 |
| 5121 | E11 |
| 5123 | G5 |
| 5130 | E5 |
| 5131 | C6 |
| 6103 | B2 |
| 6105-1 | F3 |
| 6105-2 | G5 |
| 6106 | C3 |
| 6107 | G13 |
| 6120 | C13 |
| 6130 | E5 |
| 6131 | D5 |
| 7101 | C8 |
| 7102 | C6 |
| 7103 | H7 |
| 7111 | C13 |
| 7112 | G12 |
| T102 | B2 |
| T103 | B2 |
| T105 | F2 |
| T106 | F2 |
| T109 | B6 |
| T110 | F5 |
| T111 | F4 |
| T112 | F7 |
| T113 | A8 |
| T114 | B10 |
| T115 | A8 |
| T116 | F10 |
| T117 | G13 |
| T118 | G11 |
| T120 | F13 |
| T121 | F13 |
| T122 | F13 |
| T123 | E13 |
| T124 | G14 |
| T125 | F14 |
| T126 | F13 |
| T127 | F13 |
| T128 | D7 |
| T140 | F11 |
| T141 | F10 |
| T142 | F10 |

**LEGEND**

- ⓟ...for provision only
- USA ... for USA version only
- E-EU ... for East European version only
- J ... for Japanese version only

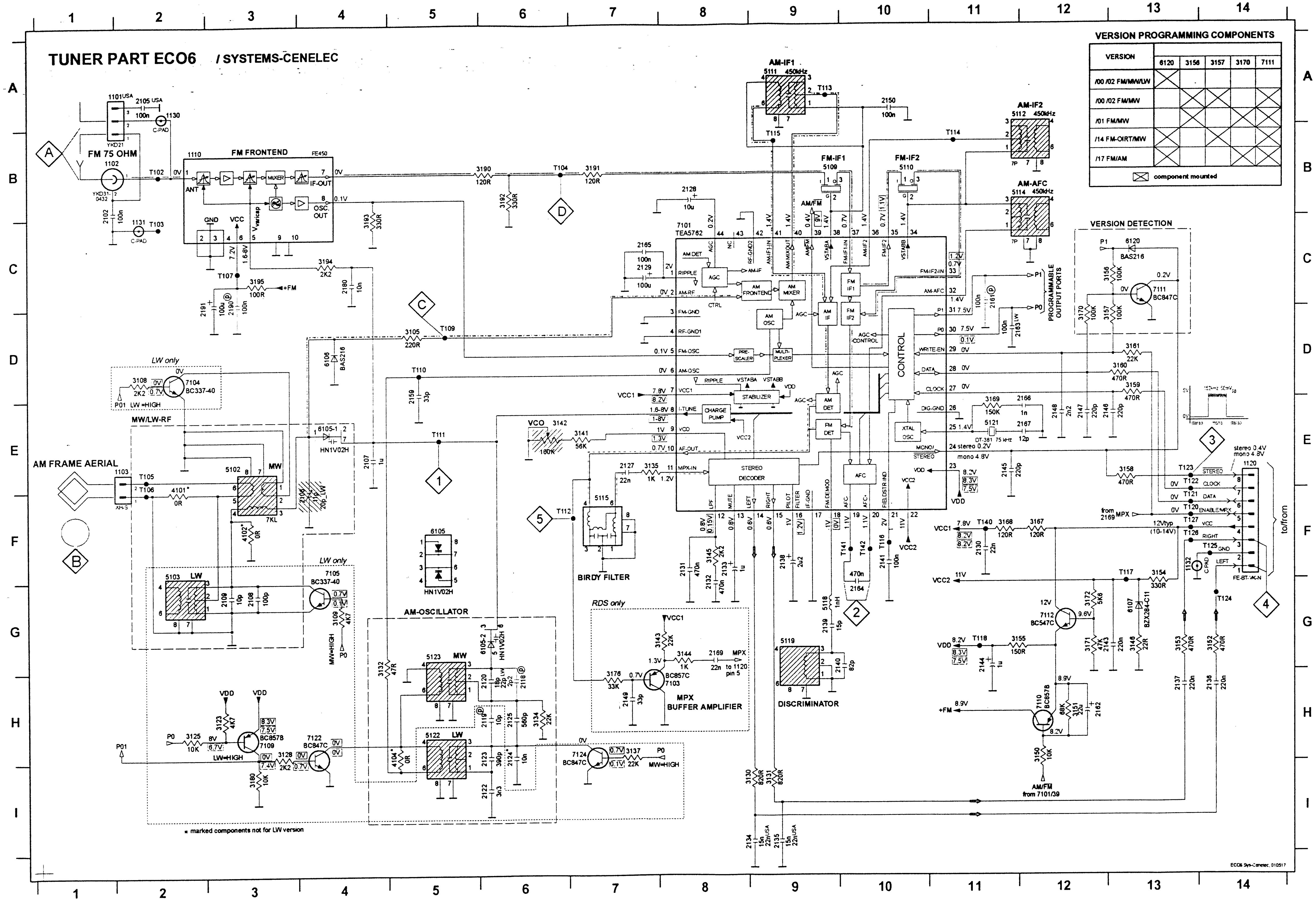
Ⓥ EVM

...V FM mode stereo
▭...V MW mode
⬚...V LW mode
voltages measured while
set is tuned to a strong transmitter

**Signal path**

— FM
-·- AM
--- MPX (Audio Frequency)
➡ AF - left/right

# TUNER PART ECO6 / SYSTEMS-CENELEC


1
2
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11
12
13
14
A
B
C
D
E
F
G
H
I
1101USA
2105 USA
100n
1130
C-PAD
YKD21
FM 75 OHM
1102
YKD31-0432
T102
2102
100n
1131
T103
C-PAD
1110
FM FRONTEND
FE450
ANT
MIXER
IF-OUT
OSC OUT
GND
VCC
Vvaricap
T107
3195
100R
+FM
2191
2190
3194
2K2
2180
3190
120R
T104
3191
120R
3192
330R
3193
330R
AM-IF1
5111 450kHz
T113
2150
100n
T115
T114
AM-IF2
5112 450kHz
FM-IF1
5109
FM-IF2
5110
AM-AFC
5114 450kHz
2128
10u
7101
TEA5762
2165
100n
2129
100u
AM DET
RIPPLE
AM-RF
AGC
CTRL
AM FRONTEND
AM MIXER
AM OSC
AM IF
FM IF1
FM IF2
PRE-SCALER
MULTI-PLEXER
CONTROL
STABILIZER
CHARGE PUMP
AM DET
FM DET
XTAL OSC
STEREO DECODER
AFC
FM-GND
RF-GND1
FM-OSC
AM-OSC
VCC1
I-TUNE
VCO
AF-OUT
MPX-IN
WRITE-EN
DATA
CLOCK
DIG-GND
MONO/STEREO
VDD
LPF
MUTE
LEFT
RIGHT
PILOT
FILTER
LF-GND
FM-DEMOD
AFC-
AFC+
FIELDSTR IND
PROGRAMMABLE OUTPUT PORTS
P1
P0
2161
2163
3169
150K
2166
1n
5121
DT-381 75 kHz
2167
12p
2148
2n2
2147
220p
2146
220p
2145
220p
VERSION PROGRAMMING COMPONENTS
VERSION DETECTION
6120
BAS216
3156
100K
3157
100K
3170
100K
7111
BC847C
3161
22K
3160
470R
3159
470R
3158
470R
T123
T122
T121
T120
T127
T126
T125
STEREO
CLOCK
DATA
ENABLE/MPX
VCC
RIGHT
GND
LEFT
1120
FE-BT-VK-N
to/from
stereo 0.4V
mono 4.8V
from 2169 MPX
12Vtyp (10-14V)
T140
3168
120R
3167
120R
2130
22n
VCC2
T117
3154
330R
1132
C-PAD
T124
7112
BC547C
3172
5K6
6107
BZX284-C11
3171
47K
2143
220n
3146
22R
3153
470R
3152
470R
2137
220n
2136
220n
VDD
T118
3155
150R
2144
1u
7110
BC857B
3151
68K
2162
3150
10K
AM/FM from 7101/39
+FM
LW only
3108
2K2
7104
BC337-40
P01 LW=HIGH
MW/LW-RF
6105-1
HN1V02H
T111
2107
1u
AM FRAME AERIAL
1103
XH-5
T105
T106
4101*
0R
5102
MW
7KL
2106
4102*
0R
5103
LW
2109
10p
2108
100p
7105
BC337-40
3109
4K7
MW=HIGH
P0
3105
220R
T109
6106
BAS216
T110
2159
33p
6105
HN1V02H
AM-OSCILLATOR
5123
MW
6105-2
HN1V02H
2120
2118
3132
47R
3134
22K
5122
LW
4104*
0R
2119
10p
2125
560p
2123
390p
2124*
10n
2122
3n3
VDD
3123
4K7
7109
BC857B
P0
3125
10K
LW=HIGH
3128
2K2
7122
BC847C
3180
10K
P01
7124
BC847C
3137
22K
MW=HIGH
VCO
3142
100K
3141
56K
2127
22n
3135
1K
5115
T112
BIRDY FILTER
RDS only
VCC1
3143
22K
3144
1K
2169
22n
MPX
to 1120 pin 5
3176
33K
2149
33p
BC857C
7103
MPX BUFFER AMPLIFIER
2131
470n
2132
470n
3145
2K2
2133
1u
2138
2u2
5118
1nH
2139
15p
T141
T142
470n
2164
T116
2141
100n
5119
2140
82p
DISCRIMINATOR
3130
820R
3131
820R
2134
15n
22nUSA
2135
15n
22nUSA
* marked components not for LW version
ECO6 Sys-Cenelec 010517

## VERSION PROGRAMMING COMPONENTS

| VERSION | 6120 | 3156 | 3157 | 3170 | 7111 |
|---|---|---|---|---|---|
| /00 /02 FM/MW/LW | ☒ | | | | |
| /00 /02 FM/MW | | ☒ | ☒ | | ☒ |
| /01 FM/MW | | ☒ | | ☒ | ☒ |
| /14 FM-OIRT/MW | ☒ | | ☒ | | ☒ |
| /17 FM/AM | ☒ | | | ☒ | ☒ |

☒ component mounted

| | |
|---|---|
| 1101 | A2 |
| 1102 | B1 |
| 1103 | E2 |
| 1110 | B2 |
| 1120 | E14 |
| 1130 | A2 |
| 1131 | C2 |
| 1132 | F13 |
| 2102 | B1 |
| 2105 | A2 |
| 2106 | E3 |
| 2107 | E4 |
| 2108 | G3 |
| 2109 | G3 |
| 2118 | H6 |
| 2119 | H6 |
| 2120 | H6 |
| 2122 | I6 |
| 2123 | H6 |
| 2124 | H6 |
| 2125 | H6 |
| 2127 | E7 |
| 2128 | B8 |
| 2129 | C7 |
| 2130 | F11 |
| 2131 | F8 |
| 2132 | F8 |
| 2133 | F8 |
| 2134 | I8 |
| 2135 | I9 |
| 2136 | H14 |
| 2137 | H13 |
| 2138 | F9 |
| 2139 | G9 |
| 2140 | G9 |
| 2141 | F10 |
| 2143 | G12 |
| 2144 | G11 |
| 2145 | E11 |
| 2146 | E12 |
| 2147 | E12 |
| 2148 | E12 |
| 2149 | H7 |
| 2150 | A10 |
| 2159 | D5 |
| 2161 | C11 |
| 2162 | H12 |
| 2163 | D11 |
| 2164 | G10 |
| 2165 | C7 |
| 2166 | E11 |
| 2167 | E11 |
| 2169 | G8 |
| 2180 | C4 |
| 2190 | C3 |
| 2191 | C3 |
| 3105 | D5 |
| 3108 | D2 |
| 3109 | G4 |
| 3123 | H3 |
| 3125 | H2 |
| 3128 | H3 |
| 3130 | I9 |
| 3131 | I9 |
| 3132 | G4 |
| 3134 | H6 |
| 3135 | E7 |
| 3137 | H7 |
| 3141 | E7 |
| 3142 | E6 |
| 3143 | G7 |
| 3144 | G8 |
| 3145 | F8 |
| 3146 | G13 |
| 3150 | H12 |
| 3151 | H12 |
| 3152 | G14 |
| 3153 | G13 |
| 3154 | F13 |
| 3155 | G12 |
| 3156 | C12 |
| 3157 | D12 |
| 3158 | E13 |
| 3159 | D13 |
| 3160 | D13 |
| 3161 | D13 |
| 3167 | F12 |
| 3168 | F11 |
| 3169 | E11 |
| 3170 | D12 |
| 3171 | G12 |
| 3172 | G12 |
| 3176 | H7 |
| 3180 | I3 |
| 3190 | B6 |
| 3191 | B7 |
| 3192 | B6 |
| 3193 | B4 |
| 3194 | C4 |
| 3195 | C3 |
| 4101 | E2 |
| 4102 | F3 |
| 4104 | H5 |
| 5102 | E3 |
| 5103 | F2 |
| 5109 | B9 |
| 5110 | B10 |
| 5111 | A9 |
| 5112 | A11 |
| 5114 | B11 |
| 5115 | E7 |
| 5118 | G9 |
| 5119 | G9 |
| 5121 | E11 |
| 5122 | H5 |
| 5123 | G5 |
| 6105-1 | E4 |
| 6105-2 | G6 |
| 6106 | D4 |
| 6107 | G13 |
| 6120 | C13 |
| 7101 | C8 |
| 7103 | H8 |
| 7104 | D2 |
| 7105 | F4 |
| 7109 | H3 |
| 7110 | H12 |
| 7111 | C13 |
| 7112 | G12 |
| 7122 | H4 |
| 7124 | H7 |
| T102 | B2 |
| T103 | B2 |
| T104 | B6 |
| T105 | E2 |
| T106 | E2 |
| T107 | C3 |
| T109 | D5 |
| T110 | D5 |
| T111 | E5 |
| T112 | F7 |
| T113 | A9 |
| T114 | B11 |
| T116 | F10 |
| T117 | F13 |
| T118 | G11 |
| T120 | F13 |
| T121 | F13 |
| T122 | E13 |
| T123 | E13 |
| T124 | G14 |
| T125 | F14 |
| T126 | F13 |
| T127 | F13 |
| T140 | F11 |
| T141 | F10 |
| T142 | F10 |

## LEGEND

* ... only assembled in FM/AM-version
ⓟ ...for provision only
USA ... for USA version only
LW ... for LW version only

**SMD jumper**
41xx
0R

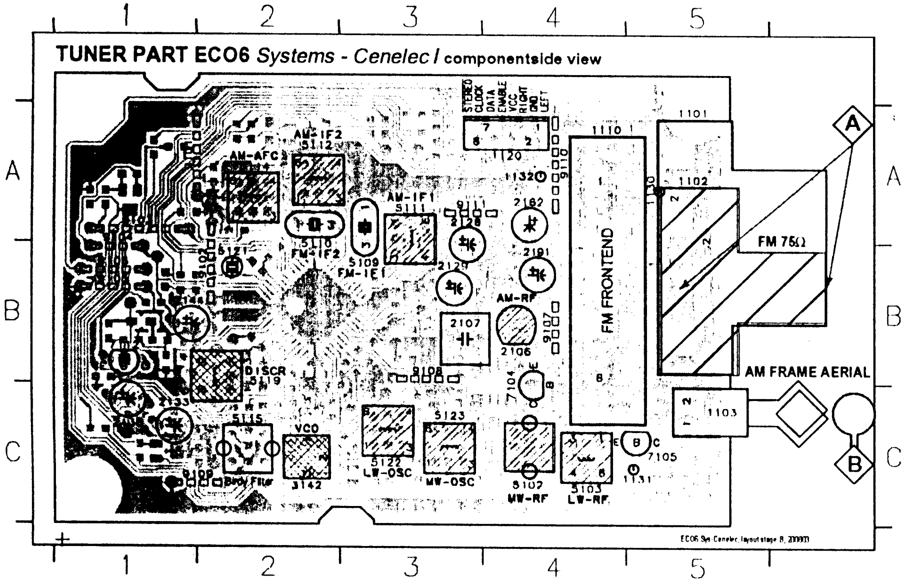
Ⓥ EVM

..V FM mode stereo
..V MW mode
..V LW mode
voltages measured while set is tuned to a strong transmitter

**Signal path**
— FM
-·- AM
- - - MPX (Audio Frequency)
⇨ AF - left/right

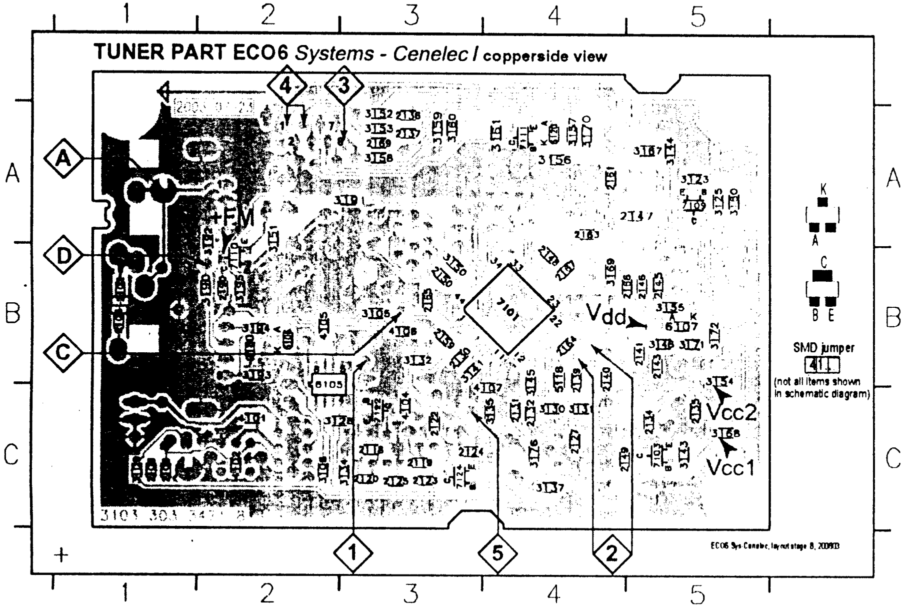
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 B5 | 1110 B4 | 1131 C5 | 2107 B3 | 2133 C1 | 2162 A4 | 5102 C4 | 5110 A2 | 5114 A2 | 5121 B2 | 7104 C4 | 9101 A2 | 9104 B1 | 9107 B4 | 9110 A4 |
| 1102 B5 | 1120 A4 | 1132 A4 | 2128 A3 | 2138 B1 | 2191 B4 | 5103 C4 | 5111 A3 | 5115 C2 | 5122 C3 | 7105 C5 | 9102 B2 | 9105 B1 | 9108 B3 | 9111 A3 |
| 1103 C5 | 1130 A5 | 2106 B4 | 2129 B3 | 2144 B1 | 3142 C2 | 5109 B3 | 5112 A2 | 5119 B2 | 5123 C3 | 7112 B1 | 9103 A1 | 9106 B1 | 9109 C2 | |

## TUNER PART ECO6 *Systems - Cenelec* / componentside view



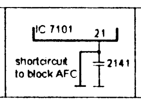
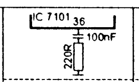
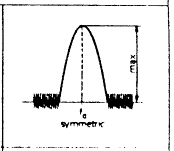
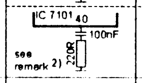
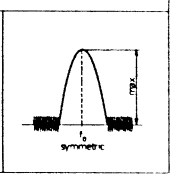
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2102 B1 | 2120 C3 | 2130 B3 | 2137 A3 | 2146 B5 | 2161 A4 | 2169 A3 | 3123 A5 | 3134 C3 | 3145 C4 | 3154 B5 | 3160 A3 | 3171 B5 | 3192 A2 | 4104 C3 | 6106 B2 | 7110 B2 |
| 2105 B1 | 2122 C3 | 2131 C4 | 2139 B4 | 2147 A5 | 2163 A4 | 2180 B2 | 3125 A5 | 3135 C4 | 3146 B5 | 3155 B5 | 3161 A4 | 3172 B5 | 3193 B2 | 4105 B2 | 6107 B5 | 7111 A4 |
| 2108 C1 | 2123 C3 | 2132 C4 | 2140 B4 | 2148 B4 | 2164 B4 | 2190 B2 | 3128 C2 | 3137 C4 | 3150 B3 | 3156 A4 | 3167 A5 | 3176 C4 | 3194 B2 | 4106 B3 | 6120 A4 | 7122 C3 |
| 2109 C1 | 2124 C3 | 2134 C5 | 2141 B5 | 2149 C4 | 2165 B3 | 3105 B3 | 3130 C4 | 3141 B3 | 3151 A2 | 3157 A4 | 3168 C5 | 3180 A5 | 3195 B2 | 4107 C4 | 7101 B4 | 7124 C3 |
| 2118 C3 | 2125 C3 | 2135 C5 | 2143 B5 | 2150 B3 | 2166 B5 | 3108 C2 | 3131 C4 | 3143 C5 | 3152 A3 | 3158 A3 | 3169 B4 | 3190 B2 | 4101 C2 | 5118 C4 | 7103 C5 | |
| 2119 C3 | 2127 C4 | 2136 A3 | 2145 B5 | 2159 B3 | 2167 B4 | 3109 C1 | 3132 B3 | 3144 A5 | 3153 A3 | 3159 A3 | 3170 A4 | 3191 A3 | 4102 C2 | 6105 B2 | 7109 A5 | |

## TUNER PART ECO6 *Systems - Cenelec* / copperside view


1
2
3
4
5
A
B
C
4
3
A
D
C
1
5
2
7101
Vdd
Vcc2
Vcc1
K
A
C
B E
SMD jumper
4101
(not all items shown in schematic diagram)
3103
ECO6 Sys-Cenelec, layout stage 8, 200900

These assembly drawings show a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

## TUNER ADJUSTMENT TABLE ( ECO6 Cenelec FM/MW - and FM/MW/LW - versions with AM-frame aerial )

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter |
|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(50kHz grid) | | | 108MHz | check | ◇1 | 8V ±1.2V |
| | | | 87.5MHz | check | | 1.6V ±0.5V |
| **MW**<br>531 - 1602kHz<br>(9kHz grid) | | | 1602kHz | 5123 | | 8V ±0.2V 3-band<br>6.9V ±0.2V 2-band |
| | | | 531kHz | check | | 1.1V ±0.4V |
| **LW**<br>153 - 279kHz<br>(3kHz grid) | | | 279kHz | 5122 | | 8V ±0.2V |
| | | | 153kHz | check | | 1.1V ±0.4V |
| *FM - IF* | | | | | | |
| **FM** | 10.7MHz, 45mV continuous wave | ◇D |  IC 7101 21 shortcircuit to block AFC 2141 | 5119 | ◇2 | 0mV ±3mV |
| *FM - VCO* | | | | | | |
| **FM** | 98MHz, 1mV continuous wave | ◇A | 98MHz | 3142 | ◇3 | 152kHz ±1kHz 1) |
| *FM RF (channel separation)* | Note: The FM-frontend unit has already been adjusted by the factory and needs therefore no further adjustments for service purposes. | | | | | |
| **FM** | 98MHz, 1mV<br>90% Left + 9% pilot<br>mod=1kHz | ◇A | 98MHz | IF coil inside FM frontend 1110 | ◇4 | right channel min |
| *AM IF* | | | | | | |
| **MW** | 450kHz<br>connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc | ◇C<br>Δf = ±10kHz<br>$V_{RF}$ = 0.5mV<br>(as low as possible) |  IC 7101 36 100nF 220R | 5111 | ◇5 |  max f0 symmetric |
| | | |  IC 7101 40 100nF 220R see remark 2) | 5112 | | |
| *AM AFC*<br>**MW** | | ◇C<br>continuous wave<br>$V_{RF}$ = 2mV | | 5114 | ◇2 | 0mV ±2mV |
| *AM RF* 3) | | | | | | |
| **MW** | 1494kHz | ◇B<br>Δf = ±30kHz<br>$V_{RF}$ as low as possible | 1494kHz | 2106 | ◇5 |  max f0 symmetric |
| | 558kHz | | 558kHz | 5102 | | |
| **LW** | 198kHz | | 198kHz | 5103 | | |

ECO6 Sys Cenelec 190900

Use Service Testprogram. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used! MW has to be aligned before LW.

↕ Repeat

# Electrical Partslist *ECO6* SYSTEMS-CENELEC

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 1101 | 2422 015 19376 | SOCKET CLICKFIT 2P | USA only |
| 1102 | 4822 267 10283 | SOCKET COAX, IEC 75Ω | not USA |
| 1103 | 4822 265 31184 | JST CONNECTOR, 2 POLE | |
| 1110 | 2422 542 90071 | FM FRONTEND | |
| 1120 | 4822 265 11515 | FFC SOCKET, 8P | |

### CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2102⊙ | 4822 126 13838 | 100nF | 10% | 50V | not USA |
| 2105⊙ | 4822 126 13838 | 100nF | 10% | 50V | USA only |
| 2106 | 2020 800 00204 | TRIMCAP. 4,2 - 20pF, N750 | | | LW only |
| 2106 | 2020 800 00191 | TRIMCAP. 3 - 11pF, N450 | | | FM/AM only |
| 2107 | 4822 121 51319 | 1µF | 20% | 50V | |
| 2108⊙ | 5322 122 32531 | 100pF | 5% | 50V | LW only |
| 2109⊙ | 5322 122 32448 | 10pF | 5% | 50V | LW only |
| 2120⊙ | 4822 126 13689 | 18pF | 1% | 63V | FM/AM only |
| 2120⊙ | 5322 122 32658 | 22pF | 5% | 50V | LW only |
| 2122⊙ | 4822 122 33891 | 3,3nF | 10% | 63V | LW only |
| 2123⊙ | 2020 552 93494 | 390pF | 1% | 50V | LW only |
| 2124⊙ | 4822 122 33177 | 10nF | 20% | 50V | FM/AM only |
| 2125⊙ | 2020 552 96199 | 560pF | 1% | 50V | |
| 2127⊙ | 4822 126 14076 | 220nF | 20% | 25V | |
| 2128 | 4822 124 40248 | 10µF | 20% | 63V | |
| 2129 | 4822 124 41584 | 100µF | 20% | 10V | |
| 2130⊙ | 5322 122 32654 | 22nF | 10% | 63V | |
| 2131⊙ | 4822 126 13482 | 470nF | 20% | 16V | |
| 2132⊙ | 4822 126 13482 | 470nF | 20% | 16V | |
| 2133 | 4822 124 21913 | 1µF | 20% | 63V | |
| 2134⊙ | 3198 017 31530 | 15nF | 10% | 50V | not USA |
| 2134⊙ | 5322 122 32654 | 22nF | 10% | 63V | USA only |
| 2135⊙ | 3198 017 31530 | 15nF | 10% | 50V | not USA |
| 2135⊙ | 3198 017 32230 | 22nF | 10% | 25V | USA only |
| 2136⊙ | 4822 126 14076 | 220nF | 20% | 25V | |
| 2137⊙ | 4822 126 14076 | 220nF | 20% | 25V | |
| 2138 | 4822 124 22652 | 2,2µF | 20% | 50V | |
| 2139⊙ | 4822 126 14236 | 15pF | 5% | 50V | |
| 2140⊙ | 4822 126 13695 | 82pF | 1% | 63V | |
| 2141⊙ | 4822 126 13838 | 100nF | 10% | 50V | |
| 2143⊙ | 4822 126 14076 | 220nF | 20% | 25V | |
| 2144 | 4822 124 21913 | 1µF | 20% | 63V | |
| 2145⊙ | 4822 122 33575 | 220pF | 5% | 50V | |
| 2146⊙ | 4822 122 33575 | 220pF | 5% | 50V | |
| 2147⊙ | 4822 122 33575 | 220pF | 5% | 50V | |
| 2148⊙ | 4822 122 33127 | 2,2nF | 10% | 63V | |
| 2149⊙ | 5322 122 32659 | 33pF | 5% | 50V | RDS only |
| 2150⊙ | 4822 126 13838 | 100nF | 10% | 50V | |
| 2159⊙ | 5322 122 31151 | 22µF | 20% | 50V | |
| 2163⊙ | 4822 126 13838 | 100nF | 10% | 50V | LW only |
| 2164⊙ | 4822 126 13482 | 470nF | 20% | 16V | |
| 2165⊙ | 4822 126 13838 | 100nF | 10% | 50V | |
| 2166⊙ | 5322 122 31647 | 1nF | 10% | 63V | |
| 2167⊙ | 4822 122 33926 | 12pF | 5% | 50V | |
| 2169⊙ | 4822 122 33127 | 2,2nF | 10% | 63V | RDS only |
| 2180⊙ | 3198 017 31030 | 10nF | 10% | 50V | |
| 2190⊙ | 4822 126 13838 | 100nF | 10% | 50V | |
| 2191 | 4822 124 40178 | 100µF | 20% | 10V | |

### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3105⊙ | 4822 117 11503 | 220Ω | 5% | 0,1W | |
| 3108⊙ | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | LW only |
| 3109⊙ | 4822 051 20472 | 4,7kΩ | 5% | 0,1W | LW only |
| 3123⊙ | 4822 051 20472 | 4,7kΩ | 5% | 0,1W | LW only |
| 3125⊙ | 4822 117 10833 | 10kΩ | 1% | 0,1W | LW only |
| 3128⊙ | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | LW only |
| 3130⊙ | 3198 021 38210 | 820Ω | 5% | 0,06W | |
| 3131⊙ | 3198 021 38210 | 820Ω | 5% | 0,06W | |
| 3132⊙ | 4822 051 20479 | 47Ω | 5% | 0,1W | |
| 3134⊙ | 4822 051 20223 | 22kΩ | 5% | 0,1W | |
| 3135⊙ | 3198 021 31020 | 1kΩ | 5% | 0,06W | |
| 3137⊙ | 4822 051 20223 | 22kΩ | 5% | 0,1W | LW only |
| 3141⊙ | 4822 117 11148 | 56kΩ | 1% | 0,1W | |
| 3142 | 4822 100 12159 | TRIMPOT. 100kΩ | | | |
| 3143⊙ | 4822 051 20223 | 22kΩ | 5% | 0,1W | RDS only |
| 3144⊙ | 4822 051 10102 | 1kΩ | 2% | 0,25W | RDS only |
| 3145⊙ | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | |
| 3146⊙ | 4822 051 20229 | 22Ω | 5% | 0,1W | |
| 3150⊙ | 4822 117 10833 | 10kΩ | 1% | 0,1W | |
| 3151⊙ | 4822 051 20683 | 68kΩ | 5% | 0,1W | |
| 3152⊙ | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3153⊙ | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3154⊙ | 4822 117 13577 | 330Ω | 1% | 0,1W | |
| 3155⊙ | 4822 117 10353 | 150Ω | 5% | 0,1W | |
| 3156⊙ | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3157⊙ | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3158⊙ | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3159⊙ | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3160⊙ | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3161⊙ | 4822 051 20223 | 22kΩ | 5% | 0,1W | |
| 3167⊙ | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3168⊙ | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3169⊙ | 4822 051 20154 | 150kΩ | 5% | 0,1W | |
| 3170⊙ | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3171⊙ | 4822 117 10834 | 47kΩ | 1% | 0,1W | |
| 3172⊙ | 4822 051 20562 | 5,6kΩ | 5% | 0,1W | |
| 3176⊙ | 4822 051 20333 | 33kΩ | 5% | 0,1W | RDS only |
| 3180⊙ | 4822 117 10833 | 10kΩ | 1% | 0,1W | LW only |
| 3190⊙ | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3191⊙ | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3192⊙ | 4822 117 13577 | 330Ω | 1% | 0,1W | |
| 3193⊙ | 4822 117 13577 | 330Ω | 1% | 0,1W | |
| 3194⊙ | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | |
| 3195⊙ | 4822 051 20101 | 100Ω | 5% | 0,1W | |
| 4101⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | FM/AM only |
| 4102⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | FM/AM only |
| 4104⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | FM/AM only |
| 4105⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4106⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4107⊙ | 4822 051 20008 | CHIP JUMPER 0805 | | | |

### COILS

| | | | |
|---|---|---|---|
| 5102 | 4822 157 71634 | RF-COIL MW | |
| 5103 | 2422 549 44107 | RF-COIL LW | LW only |
| 5109 | 4822 157 71639 | FM-IF FILTER 10,7MHz | |
| 5110 | 4822 242 70665 | FM-IF FILTER 10,7MHz | |
| 5111 | 2422 549 44023 | AM-IF FILTER 450kHz | |
| 5112 | 4822 157 70302 | AM-IF FILTER 450kHz | |
| 5114 | 4822 157 70302 | AM-IF FILTER 450kHz | |
| 5115 | 4822 157 71636 | ANTI BIRDY FILTER | |
| 5118⊙ | 2422 535 95881 | 100nH | |
| 5119 | 4822 157 11443 | DISCRIMINATOR COIL | |
| 5121 | 4822 242 10261 | QUARTZ 75kHz | |
| 5122 | 2422 549 44108 | RF-COIL, LW-OSCILLATOR | LW only |
| 5123 | 2422 549 44108 | RF-COIL, MW-OSCILLATOR | |

### DIODES

| | | | |
|---|---|---|---|
| 6105⊙ | 4822 130 83075 | HN1V02H | |
| 6106⊙ | 4822 130 83757 | BAS216 | |
| 6107⊙ | 9340 386 90115 | BZX284-C11 | |
| 6120⊙ | 4822 130 83757 | BAS216 | |

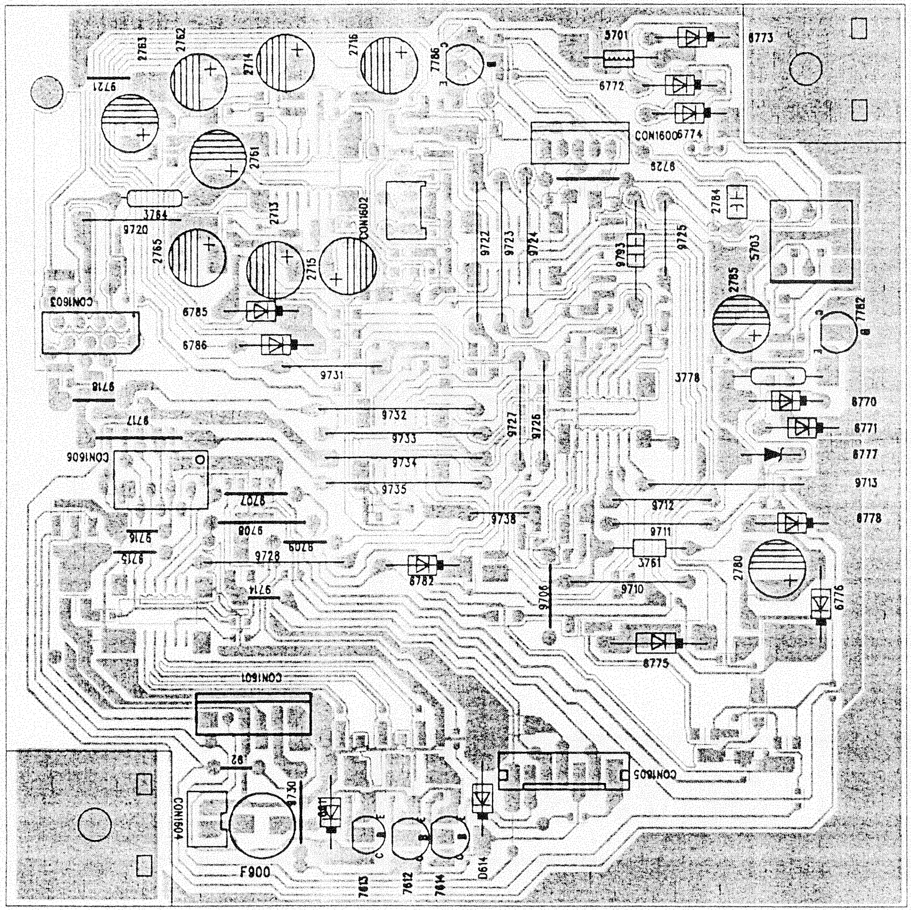
### TRANSISTORS

| | | | |
|---|---|---|---|
| 7103⊙ | 5322 130 42756 | BC857C | RDS only |
| 7104 | 9322 003 64676 | TBC337-40 | LW only |
| 7105 | 9322 003 64676 | TBC337-40 | LW only |
| 7109⊙ | 4822 130 60373 | BC856B | LW only |
| 7110⊙ | 4822 130 60373 | BC856B | |
| 7111⊙ | 5322 130 42755 | BC847C | |
| 7112 | 4822 130 44503 | BC547C | |
| 7122⊙ | 5322 130 42755 | BC847C | LW only |
| 7124⊙ | 5322 130 42755 | BC847C | LW only |

### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101 | 4822 209 90315 | TEA5762H/V1, RADIO IC |

## PCB LAYOUT - TAPE BOARD (TOP VIEW)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CON1600
8773
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2713
CON1602
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9723
9724
9793
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2784
5703
3764
9720
2765
2715
2785
7782
CON1603
6785
6786
9731
9718
9732
9733
9734
9735
9727
9726
3778
8770
8771
8777
9713
8778
CON1606
9717
9707
9708
9709
9738
9712
9711
3761
9710
9706
2780
6776
9716
9715
9728
8782
9714
8775
CON1601
CON1605
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CON1604
F900
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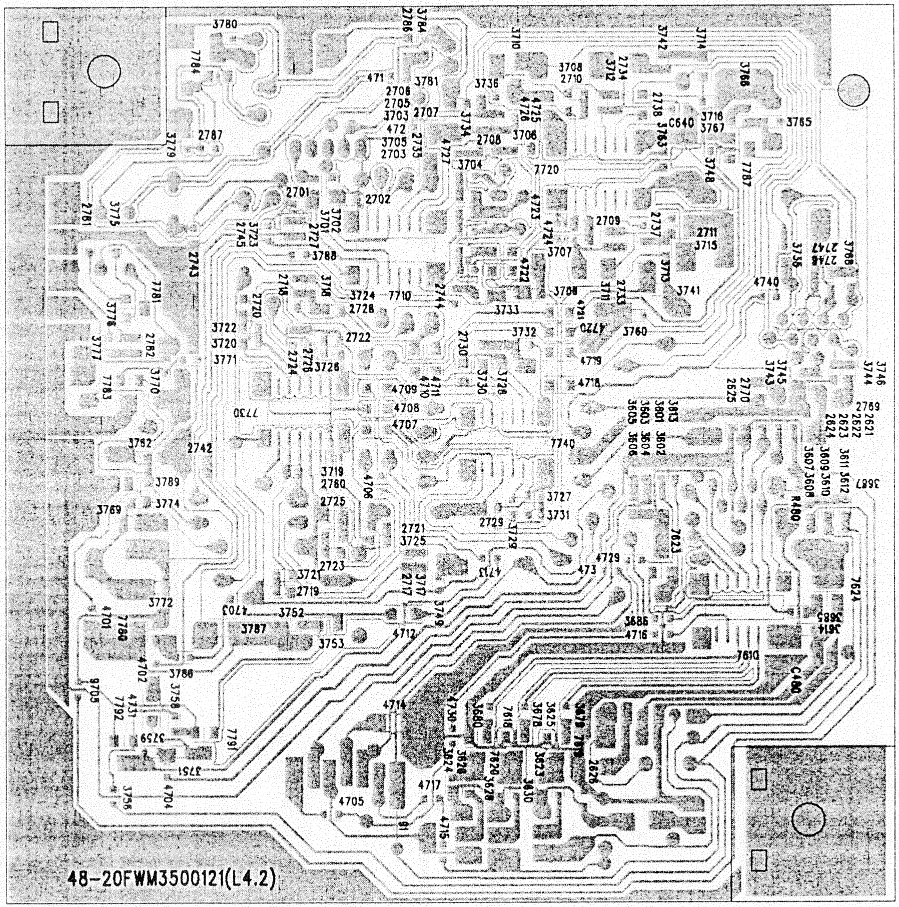
7612
7614
D614

## PCB LAYOUT - TAPE BOARD (BOTTOM VIEW)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2703
3736
3708
2710
3712
2734
2738
C640
3716
3767
3765
3779
2787
2735
3704
2708
3706
7720
7787
3748
3775
2781
2701
2702
3702
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3607
3608
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R480
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3762
2742
3789
3774
3769
3719
2760
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4706
3727
3731
2729
2721
3725
4729
473
7623
3721
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2719
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3749
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4701
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4703
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4712
3685
3614
4716
7610
C480
9705
7792
4702
3786
3758
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7791
4714
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4715
48-20FWM3500121(L4.2)

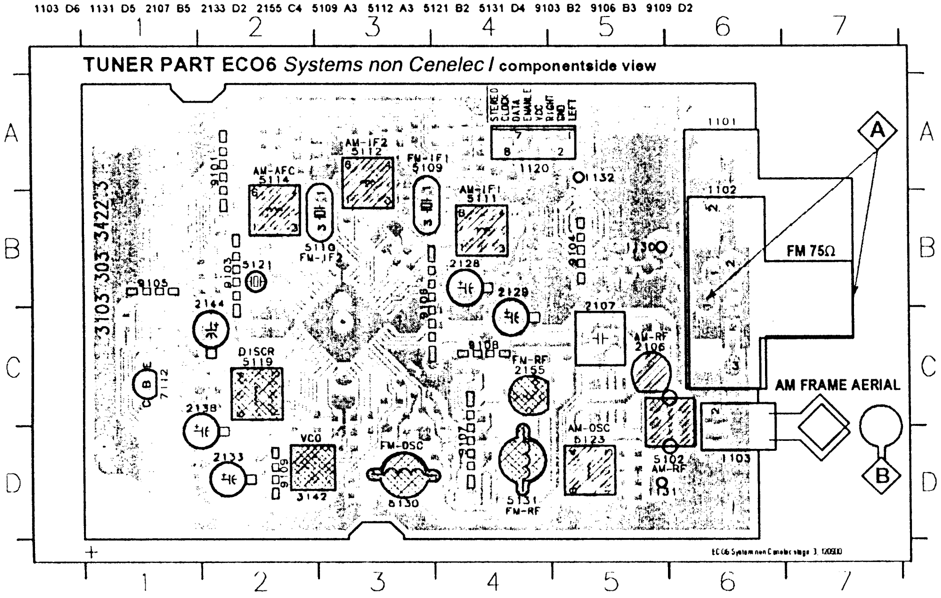
# TAPE BOARD

TABLE OF CONTENTS

PCB Layout Top View ........................................................ 8-2
PCB Layout Bottom View ................................................ 8-2
Circuit Diagram ................................................................ 8-3
Electrical Parts List .......................................................... 8-4

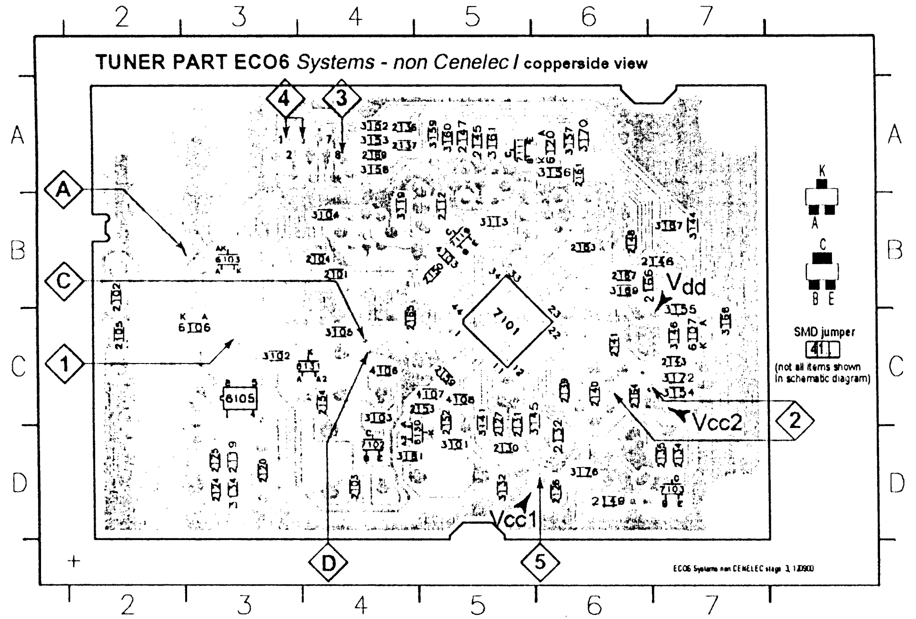
Remark: For Ver. 22, the whole Tape Board Ass'y can be orderd with 12nc: 9940 000 01508

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | A6 | 1120 | A4 | 1132 | A5 | 2128 | C4 | 2138 | C2 | 3142 | D2 | 5110 | B3 | 5114 | A2 | 5123 | D5 | 7112 | C1 | 9104 | B5 | 9107 | D4 |
| 1102 | B6 | 1130 | B5 | 2106 | C5 | 2129 | B4 | 2144 | B2 | 5102 | D6 | 5111 | B4 | 5119 | C2 | 5130 | D3 | 9101 | A2 | 9105 | B1 | 9108 | C4 |
| 1103 | D6 | 1131 | D5 | 2107 | B5 | 2133 | D2 | 2155 | C4 | 5109 | A3 | 5112 | A3 | 5121 | B2 | 5131 | D4 | 9103 | B2 | 9106 | B3 | 9109 | D2 |



**TUNER PART ECO6** *Systems non Cenelec* / componentside view

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2101 | B4 | 2119 | D3 | 2130 | D5 | 2137 | A4 | 2146 | B7 | 2153 | C5 | 2165 | C4 | 3103 | C4 | 3134 | D3 | 3152 | A4 | 3158 | A4 | 3169 | B6 | 4106 | C4 | 6107 | C7 | 7103 | D7 |
| 2102 | B1 | 2120 | D3 | 2131 | C5 | 2139 | C6 | 2147 | A5 | 2154 | C4 | 2166 | B6 | 3104 | B4 | 3141 | C5 | 3153 | A4 | 3159 | A5 | 3170 | A6 | 4107 | C5 | 6120 | A6 | 7111 | A5 |
| 2103 | D4 | 2124 | D3 | 2132 | D6 | 2140 | C6 | 2148 | B6 | 2159 | C5 | 2167 | B6 | 3105 | C4 | 3143 | D6 | 3154 | C7 | 3160 | A5 | 3172 | C7 | 4108 | C5 | 6130 | D4 | 7119 | B5 |
| 2104 | B4 | 2125 | D3 | 2134 | D7 | 2141 | C6 | 2149 | D6 | 2161 | A6 | 2169 | A4 | 3113 | B5 | 3144 | B7 | 3155 | C7 | 3161 | A5 | 3176 | D6 | 6103 | B3 | 6131 | C4 | | |
| 2105 | C1 | 2126 | D6 | 2135 | D7 | 2143 | C7 | 2150 | B5 | 2163 | B6 | 3101 | D5 | 3119 | B5 | 3145 | C5 | 3156 | A6 | 3167 | B7 | 3181 | D4 | 6105 | C3 | 7101 | C5 | | |
| 2112 | B5 | 2127 | C5 | 2136 | A4 | 2145 | A5 | 2152 | C5 | 2164 | C6 | 3102 | C3 | 3132 | D5 | 3146 | C7 | 3157 | A6 | 3168 | C7 | 4103 | B5 | 6106 | C3 | 7102 | D4 | | |

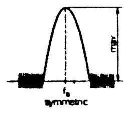
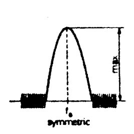

2
3
4
5
6
7
A
B
C
D
4
3
A
C
1
D
5
2
Vdd
Vcc2
Vcc1
7101
6105
6106
K
A
C
B
E
SMD jumper
4111
(not all items shown in schematic diagram)
ECO6 Systems non CENELEC stage 3, 120900

**TUNER PART ECO6** *Systems - non Cenelec* / copperside view

These assembly drawings show a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

---

## TUNER ADJUSTMENT TABLE ( ECO6 FM/MW- and FM/MW/LW - versions with AM-frame aerial )

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter |
|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | | | 108MHz | 5130 | ◇1 | 8V ±0.2V |
| | | | 87.5MHz<br>(65.81MHz) | check | | 4.3V ±0.5V<br>(1.2V ±0.5V) |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | | | 1700kHz | 5123 | | 8V ±0.2V |
| | | | 530kHz | check | | 1.1V ±0.4V |
| FM/MW-version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 6.9V ±0.2V |
| | | | 531kHz | check | | 1.1V ±0.4V |
| **LW**<br>153 - 279kHz | | | 279kHz | 5122 | | 8V ±0.2V |
| | | | 153kHz | check | | 1.1V ±0.4V |
| **MW**<br>FM/MW/LW- version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 8V ±0.2V |
| | | | 531kHz | check | | 1.1V ±0.4V |
| *FM IF* | | | | | | |
| **FM** | 10.7MHz, 45mV<br>continuous wave | ◇D | IC 7101 21<br>shortcircuit to block AFC<br>2141 | 5119 | ◇2 | 0 ± 3 mV DC |
| *FM RF* | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | 108MHz | ◇A<br>mod=1kHz<br>Δf=±22.5kHz | 108MHz | 2155 | ◇4 | MAX |
| | 87.5MHz<br>(65.81MHz) | | 87.5MHz<br>(65.81MHz) | 5131 | | |
| *VCO* | | | | | | |
| **FM** | 98MHz, 1mV<br>continuous wave | ◇A | 98MHz | 3142 | ◇3 | 152kHz ±1kHz 1) |
| *AM IF* | | | | | | |
| **MW** | 450kHz<br>connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc | ◇C<br>Δf=±10kHz<br>$V_{RF}$ = 0.5mV<br>(as low as possible) | IC 7101 36<br>100nF<br>220R | 5111 | ◇5 |  max<br>$f_0$<br>symmetric |
| | | | IC 7101 40<br>100nF<br>220R<br>see remark 2) | 5112 | | |
| *AM AFC*<br>**MW** | | ◇C<br>continuous wave<br>$V_{RF}$ = 2mV | | 5114 | ◇2 | 0 ± 2 mV DC |
| *AM RF 3)* | | | | | | |
| **MW 4)**<br>FM/MW/LW- and FM/MW-version<br>( 9kHz grid)<br>531 - 1602kHz | 1494kHz | ◇B<br>Δf = ±30kHz<br>$V_{RF}$ as low as possible | 1494kHz | 2106 | ◇5 |  max<br>$f_0$<br>symmetric |
| | 558kHz | | 558kHz | 5102 | | |
| **LW** | 198kHz | | 198kHz | 5103 | | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | 1500kHz | | 1500kHz | 2106 | | |
| | 560kHz | | 560kHz | 5102 | | |

Use Service Testprogram. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

---

## Electrical Partslist *ECO6* SYSTEMS NON-CENELEC

MISCELLANEOUS

| | | | |
|---|---|---|---|
| 1101 | 2422 015 19376 | SOCKET 2P CLICKFIT | USA only |
| 1102 | 4822 267 10283 | SOCKET COAX, IEC 75Ω | not USA |
| 1103 | 4822 265 31184 | JST CONNECTOR 2 POLE | |
| 1120 | 4822 265 11515 | FFC SOCKET, 8P | |

CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2101© | 4822 126 13692 | 47pF | 1% | 63V | |
| 2102© | 4822 126 13838 | 100nF | 10% | 50V | not USA |
| 2103© | 5322 122 31647 | 1nF | 10% | 63V | |
| 2104© | 5322 122 32531 | 100pF | 5% | 50V | |
| 2105© | 4822 126 13838 | 100nF | 10% | 50V | USA only |
| 2106 | 2020 800 00191 | 3-11pF TRIMCAP.,N450 | | | |
| 2107 | 4822 121 51319 | 1µF | 20% | 50V | |
| 2120© | 4822 126 13689 | 18pF | 1% | 63V | |
| 2124© | 5322 122 32654 | 22nF | 10% | 63V | |
| 2125© | 2020 552 96199 | 560pF | 1% | 50V | |
| 2126© | 5322 122 31863 | 330pF | 5% | 50V | |
| 2127© | 4822 126 14076 | 220nF | 20% | 25V | |
| 2128 | 4822 124 40248 | 10µF | 20% | 63V | |
| 2129 | 4822 124 41584 | 100µF | 20% | 10V | |
| 2130© | 5322 122 32654 | 22nF | 10% | 63V | |
| 2131© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2132© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2133 | 4822 124 21913 | 1µF | 20% | 63V | |
| 2134© | 4822 126 13188 | 15nF | 5% | 63V | not USA |
| 2134© | 5322 122 32654 | 22nF | 10% | 63V | USA only |
| 2135© | 4822 126 13188 | 15nF | 5% | 63V | not USA |
| 2135© | 5322 122 32654 | 22nF | 10% | 63V | USA only |
| 2136© | 4822 126 14076 | 220nF | 20% | 25V | |
| 2137© | 4822 126 14076 | 220nF | 20% | 25V | |
| 2138 | 4822 124 22652 | 2,2µF | 20% | 50V | |
| 2139© | 4822 126 14236 | 15pF | 5% | 50V | |
| 2140© | 4822 126 13695 | 82pF | 1% | 63V | |
| 2141© | 4822 126 13838 | 100nF | 10% | 50V | |
| 2143© | 4822 126 14076 | 220nF | 20% | 25V | |
| 2144 | 4822 124 21913 | 1µF | 20% | 63V | |
| 2145© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2146© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2147© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2148© | 4822 122 33127 | 2,2nF | 10% | 63V | |
| 2149© | 5322 122 32659 | 33pF | 5% | 50V | RDS only |
| 2150© | 4822 126 13838 | 100nF | 10% | 50V | |
| 2152© | 4822 126 12105 | 33nF | 5% | 63V | not for East Europe |
| 2152© | 5322 116 80853 | 560pF | 5% | 63V | for East Europe only |
| 2153© | 4822 126 13486 | 15pF | 2% | 63V | not for East Europe |
| 2153© | 4822 122 33926 | 12pF | 2% | 50V | for East Europe only |
| 2155 | 2020 800 00191 | 3-11pF TRIMCAP.,N450 | | | |
| 2159© | 5322 122 32659 | 33pF | 5% | 50V | |
| 2164© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2165© | 4822 126 13838 | 100nF | 10% | 50V | |
| 2166© | 5322 122 31647 | 1nF | 10% | 63V | |
| 2167© | 4822 122 33926 | 12pF | 5% | 50V | |
| 2169© | 4822 122 33127 | 2,2nF | 10% | 63V | RDS only |

RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3101© | 4822 051 20333 | 33kΩ | 5% | 0,1W | |
| 3102© | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3103© | 4822 051 20822 | 8,2kΩ | 5% | 0,1W | |
| 3104© | 4822 117 13577 | 330Ω | 1% | 0,1W | |
| 3105© | 4822 117 11503 | 220Ω | 5% | 0,1W | |
| 3132© | 4822 051 20479 | 47Ω | 5% | 0,1W | |
| 3134© | 4822 051 20223 | 22kΩ | 5% | 0,1W | |
| 3141© | 4822 117 11148 | 56kΩ | 1% | 0,1W | |
| 3142 | 4822 100 12159 | TRIMPOT. 100kΩ | | | |

RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3143© | 4822 051 20223 | 22kΩ | 5% | 0,1W | RDS only |
| 3144© | 4822 051 10102 | 1kΩ | 2% | 0,25W | RDS only |
| 3145© | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | |
| 3146© | 4822 051 20229 | 22Ω | 5% | 0,1W | |
| 3152© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3153© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3154© | 4822 117 13577 | 330Ω | 1% | 0,1W | |
| 3155© | 4822 117 11503 | 220Ω | 5% | 0,1W | |
| 3156© | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3157© | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3158© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3159© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3160© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3161© | 4822 051 20223 | 22kΩ | 5% | 0,1W | |
| 3167© | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3168© | 4822 051 20121 | 120Ω | 5% | 0,1W | |
| 3169© | 4822 051 20154 | 150kΩ | 5% | 0,1W | |
| 3170© | 4822 117 10837 | 100kΩ | 1% | 0,1W | |
| 3172© | 4822 051 20562 | 5,6kΩ | 5% | 0,1W | |
| 3176© | 4822 051 20333 | 33kΩ | 5% | 0,1W | RDS only |
| 3181© | 4822 051 10102 | 1kΩ | 2% | 0,25W | |
| 4103© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4106© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4107© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4108© | 4822 051 20008 | CHIP JUMPER 0805 | | | |

COILS

| | | | |
|---|---|---|---|
| 5102 | 4822 157 71634 | RF-COIL MW | |
| 5109 | 4822 242 70665 | FM-IF FILTER 10,7MHz | |
| 5110 | 4822 242 70665 | FM-IF FILTER 10,7MHz | |
| 5111 | 2422 549 44023 | AM-IF FILTER 450kHz | |
| 5112 | 4822 157 70302 | AM-IF FILTER 450kHz | |
| 5114 | 4822 157 70302 | AM-IF FILTER 450kHz | |
| 5119 | 4822 157 11443 | DISCRIMINATOR COIL | |
| 5121 | 4822 242 10261 | QUARTZ 75kHz | |
| 5123 | 2422 549 44108 | RF-COIL, AM-OSCILLATOR | |
| 5130 | 4822 157 11843 | RF COIL 1,5 TURNS | |
| 5131 | 4822 157 11843 | RF COIL 1,5 TURNS | |

DIODES

| | | | |
|---|---|---|---|
| 6103© | 5322 130 34337 | BAV99 | |
| 6105© | 4822 130 83075 | HN1V02H | |
| 6106© | 4822 130 83757 | BAS216 | |
| 6107© | 9340 386 90115 | BZX284-C11 | |
| 6120© | 4822 130 83757 | BAS216 | |
| 6130© | 4822 130 82833 | 1SV228 | |
| 6131© | 4822 130 82833 | 1SV228 | |

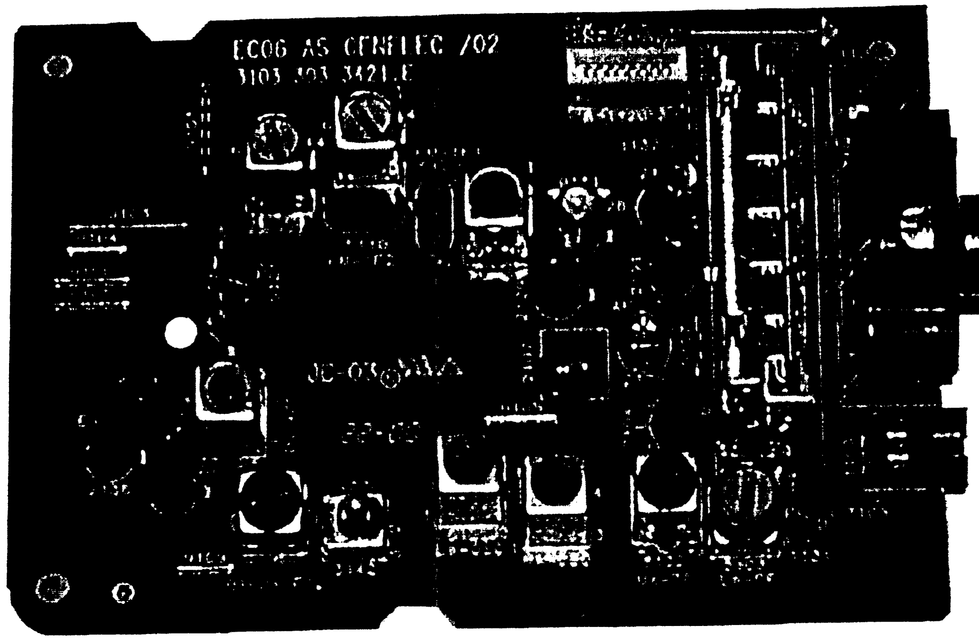
TRANSISTORS

| | | | |
|---|---|---|---|
| 7102 | 4822 130 42131 | BF550 | |
| 7103© | 5322 130 42756 | BC857C | RDS only |
| 7111© | 5322 130 42755 | BC847C | |
| 7112 | 4822 130 44503 | BC547C | |

INTEGRATED CIRCUITS

| | | | |
|---|---|---|---|
| 7101© | 9351 740 80557 | TEA5757H/V1, RADIO IC | |

---


ECO6 AS CENELEC /02
3103 303 3421.E

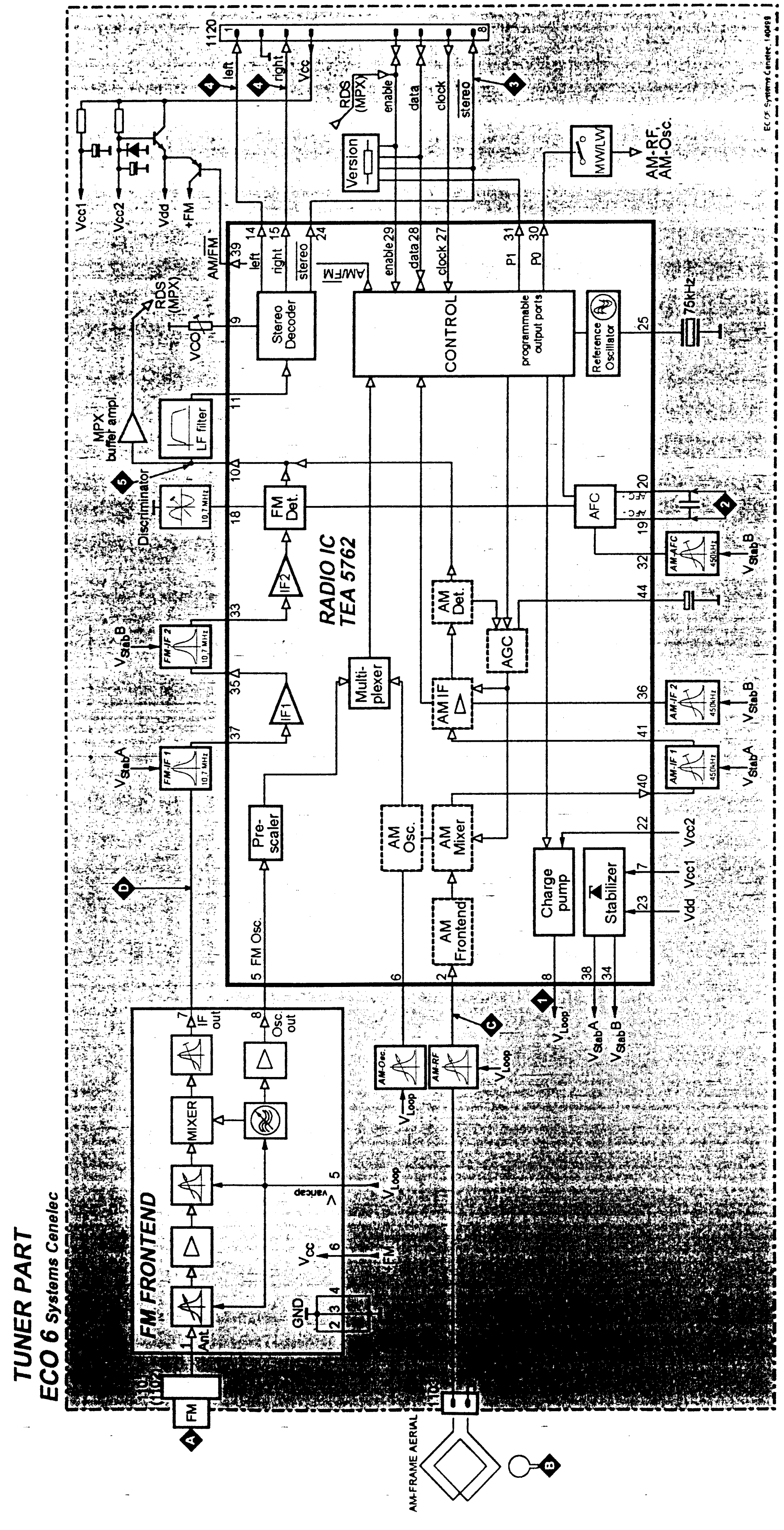
# ECO6 Tuner PART

version: ***SYSTEMS CENELEC***

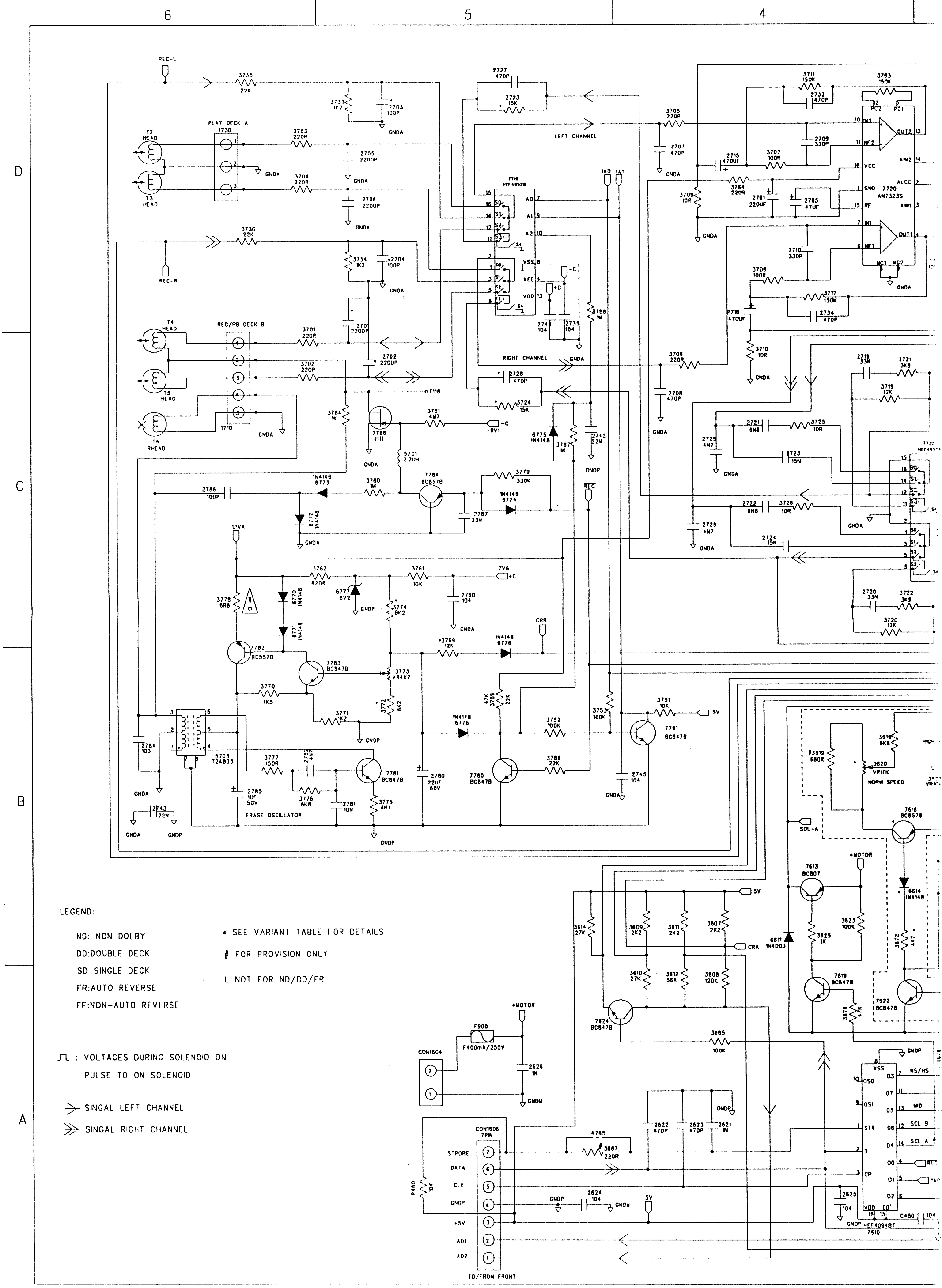
TABLE OF CONTENTS

Blockdiagram.......................................................7B-1
Schematic Diagram..............................................7B-2
Component Layout...............................................7B-3
Adjustment table ...............................................7B-3
Electrical Partslist..............................................7B-4

## BLOCK DIAGRAM


TUNER PART
ECO 6 Systems Cenelec
FM FRONTEND
MIXER
Ant
GND
Vcc
Vvaricap
IF out
Osc out
FM
AM-FRAME AERIAL
AM-Osc
AM-RF
VLoop
RADIO IC
TEA 5762
Pre-scaler
5 FM Osc.
Multi-plexer
AM Osc.
AM Mixer
AM Frontend
AM IF
AM Det.
AGC
Charge pump
Stabilizer
FM-IF 1
FM-IF 2
IF1
IF2
FM Det.
Discriminator
LF filter
MPX buffer ampl.
VCO
RDS (MPX)
Stereo Decoder
CONTROL
programmable output ports
Reference Oscillator
75kHz
AFC
AM-IF 1
AM-IF 2
AM-AFC
VStabA
VStabB
Vcc1
Vcc2
Vdd
+FM
AM/FM
left
right
stereo
enable
data
clock
P1
P0
Version
MW/LW
AM-RF, AM-Osc.
1120
8

# CIRCUIT DIAGRAM - TAPE BOARD


6
5
4
D
C
B
A
REC-L
REC-R
PLAY DECK A
1730
T2 HEAD
T3 HEAD
REC/PB DECK B
T4 HEAD
T5 HEAD
T6 RHEAD
1710
GNDA
GNDP
LEFT CHANNEL
RIGHT CHANNEL
7710 HEF4052B
7720 AN7323S
7786 J111
7784 BC857B
7782 BC557B
7783 BC847B
7781 BC847B
7780 BC847B
7791 BC847B
5703 T2AB33
5701 2.2UH
ERASE OSCILLATOR
12VA
7V6
-9V1
CRB
CRA
REC
SOL-A
+MOTOR
5V
7613 BC807
7619 BC847B
7622 BC847B
7624 BC847B
7615 BC857B
3620 VR10K NORM SPEED
CON1604
F900 F400mA/250V
GNDM
CON1606 7PIN
STROBE
DATA
CLK
GNDP
+5V
AD1
AD2
TO/FROM FRONT
7510 HEF4094BT
NS/HS
MID
SCL B
SCL A

LEGEND:

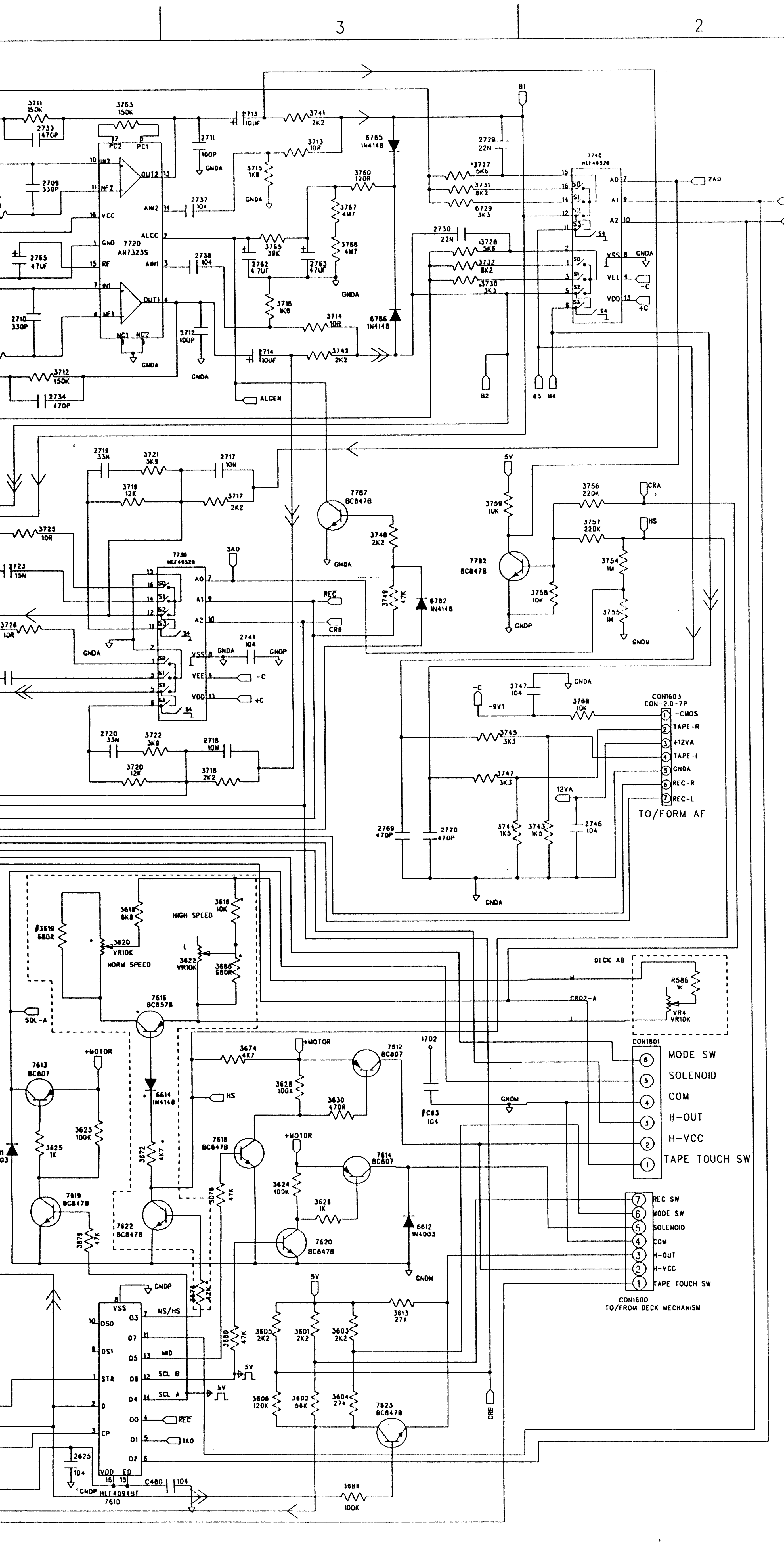
ND: NON DOLBY
DD:DOUBLE DECK
SD SINGLE DECK
FR:AUTO REVERSE
FF:NON-AUTO REVERSE

* SEE VARIANT TABLE FOR DETAILS
# FOR PROVISION ONLY
L NOT FOR ND/DD/FR

⎍ : VOLTAGES DURING SOLENOID ON PULSE TO ON SOLENOID

→ SINGAL LEFT CHANNEL

⇉ SINGAL RIGHT CHANNEL


3
2
1
D
C
B
A
7720 AN7323S
7740 HEF4952B
7730 HEF4952B
7610 HEF4094BT
2AO
2A1
2A2
B1
B2
B3
B4
ALCEN
CRA
HS
CRB
REC
-C
+C
5V
CON1603 CON-2.0-7P
-CMOS
TAPE-R
+12VA
TAPE-L
GNDA
REC-R
REC-L
TO/FORM AF
HIGH SPEED
NORM SPEED
DECK AB
CON1601
MODE SW
SOLENOID
COM
H-OUT
H-VCC
TAPE TOUCH SW
CON1600
TO/FROM DECK MECHANISM
REC SW
MODE SW
SOLENOID
COM
H-OUT
H-VCC
TAPE TOUCH SW
SDL-A
+MOTOR
NS/HS
MID
SCL B
SCL A
1AO
CRE
GNDA
GNDP
GNDM

## U1 HEF4952B

| | A2 | A1 | A0 | S0 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|
| STOP | 0 | 0 | 0 | | 1 | | | 1 |
| PB DECK A | 0 | 0 | 1 | 1 | | | | 1 |
| PB DECK B | 0 | 1 | 0 | | | 1 | | 1 |
| -- -- | 0 | 1 | 1 | 1 | | 1 | | 1 |
| REC IN | 1 | 0 | 0 | | 1 | | 1 | |
| DUBBING | 1 | 0 | 1 | 1 | | | 1 | |
| -- -- | 1 | 1 | 0 | | | 1 | 1 | |
| -- -- | 1 | 1 | 1 | | | | 1 | |

## U2 HEF4952B

| | A2 | A1 | A0 | S0 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|
| -- -- | 0 | 0 | 0 | | 1 | | | 1 |
| STOP | 0 | 0 | 1 | 1 | | | | 1 |
| -- -- | 0 | 1 | 0 | | | 1 | | 1 |
| REC | 0 | 1 | 1 | 1 | | 1 | | 1 |
| HS CHROME | 1 | 0 | 0 | | 1 | | 1 | |
| PB CHROME | 1 | 0 | 1 | 1 | | | 1 | |
| -- -- | 1 | 1 | 0 | | | 1 | 1 | |
| PB FERRO | 1 | 1 | 1 | | | | 1 | |

## U3 HEF4952B

| | A2 | A1 | A0 | S0 | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|---|---|
| NS FERRO | 0 | 0 | 0 | | 1 | | | 1 |
| HS FERRO | 0 | 0 | 1 | 1 | | | | 1 |
| REC MUTE | 0 | 1 | 0 | | | 1 | | 1 |
| REC MUTE | 0 | 1 | 1 | 1 | | 1 | | 1 |
| NS CHROME | 1 | 0 | 0 | | 1 | | 1 | |
| HS CHROME | 1 | 0 | 1 | 1 | | | 1 | |
| REC MUTE | 1 | 1 | 0 | | | 1 | 1 | |
| -- -- | 1 | 1 | 1 | | | | 1 | |

## ELECTRICAL PARTS - CASS DECK BOARD

| | | | |
|---|---|---|---|
| 3778 | ⚠ | 9940 000 01249 | FUSE RES. 6.8Ω 1/4W +/-5% |
| 5703 | | 9940 000 01251 | IFT OSC COIL 100KHZ |
| 7610 | | 5322 209 11306 | HEF4094BT |
| 7710 | | 9940 000 01248 | IC HF4952 |
| 7720 | | 9322 140 00668 | IC SM AN7323S (MATJ) |
| 7730 | | 9940 000 01248 | IC HF4952 |
| 7740 | | 9940 000 01248 | IC HF4952 |
| 7786 | | 4822 130 63494 | FET J111 |
| F900 | ⚠ | 9940 000 01252 | FUSE RADIAL F400MA/250V |

**Note:** **Only these parts mentioned in the list are normal service parts.**

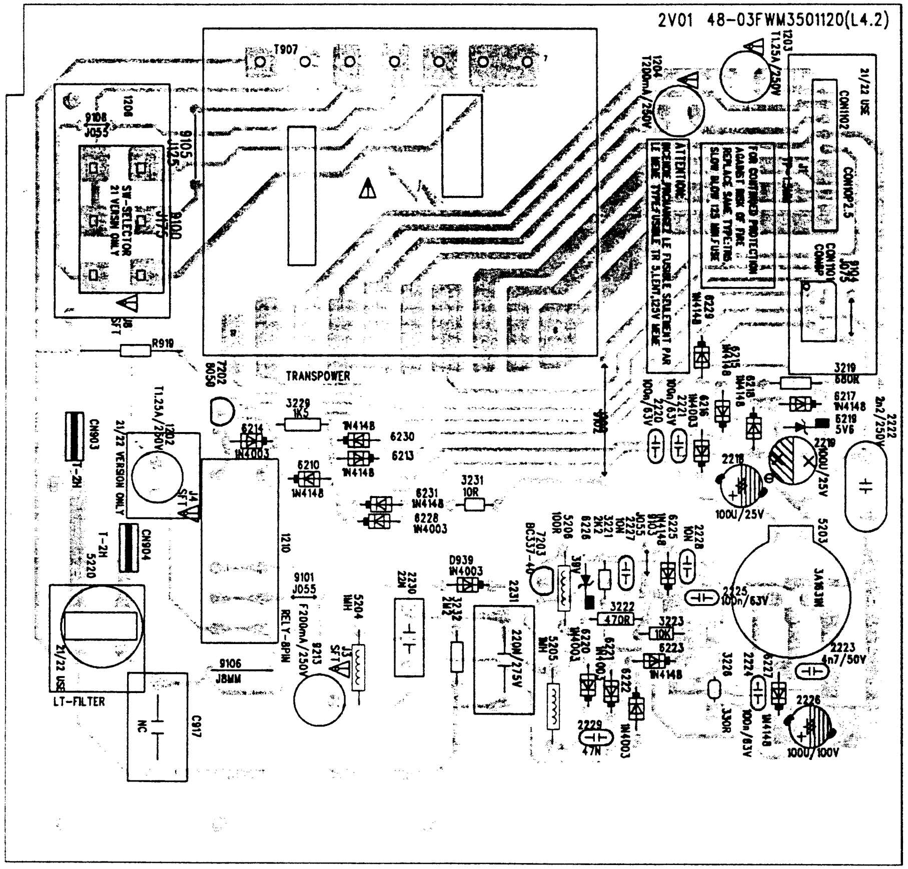
# POWER BOARD

TABLE OF CONTENTS

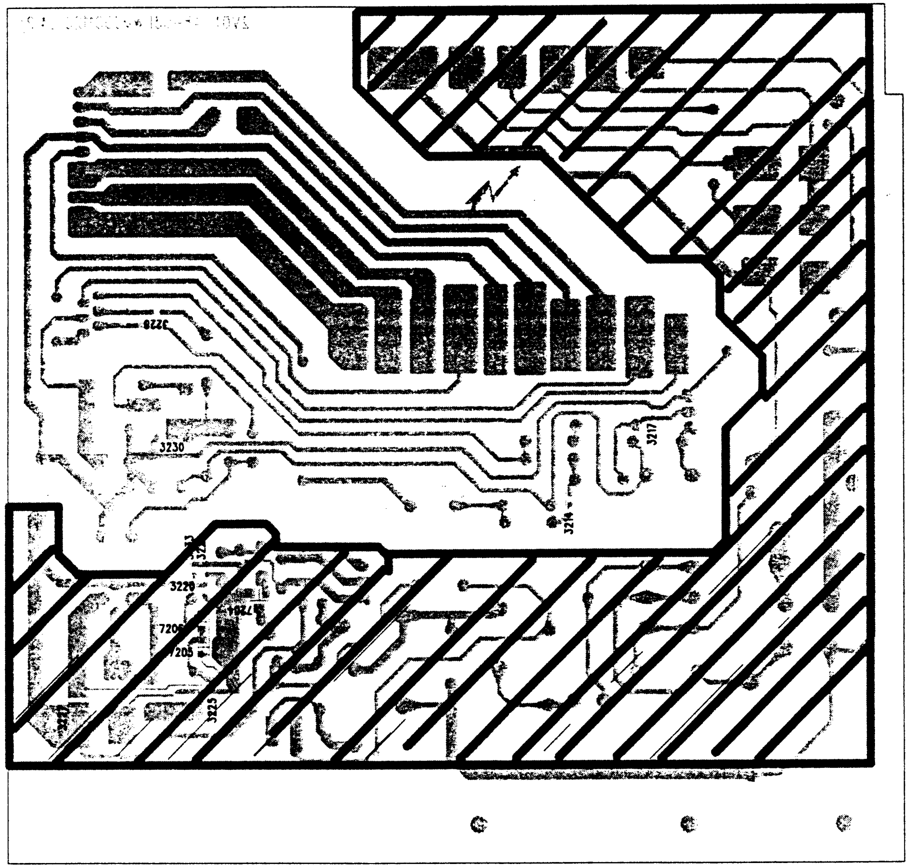
PCB Layout Top View ........................................................ 9-2
PCB Layout Bottom View ................................................. 9-2
Circuit Diagram ................................................................. 9-3
Electrical Parts List ............................................................ 9-4

Remark: For Ver. 22, the whole Power Board Ass'y can be orderd with 12nc: 9940 000 01507

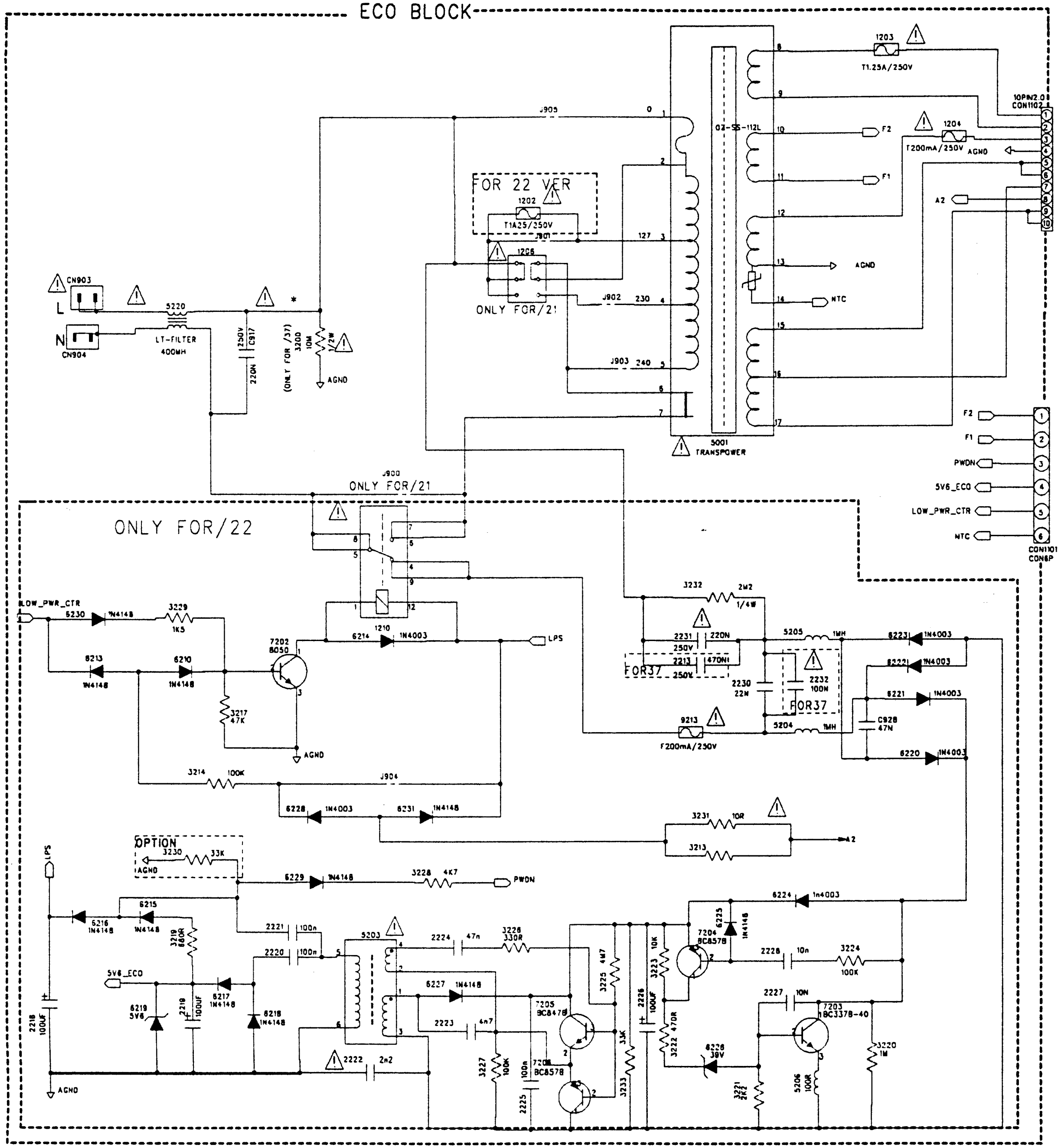
## PCB LAYOUT - POWER BOARD (TOP VIEW)


2V01 48-03FWM3501120(L4.2)
T907
1206
9108
J055
9105
J125
9100
J175
SW-SELECTOR
21 VERSION ONLY
J6
SFT
R919
7202
8050
TRANSPOWER
1204
T200mA/250V
1203
T1.25A/250V
21/22 USE
CON1102
CON10P2.5
CON1101
CONMP
9104
J075
FOR CONTINUED PROTECTION
AGAINST RISK OF FIRE
REPLACE SAME TYPE:T8S
SLOW BLOW 125 MA FUSE
ATTENTION:
INCENDIE,REMPLACEZ LE FUSIBLE SEULEMENT PAR
LE MEME TYPE,FUSIBLE TR 5,LENT,125V MEME
6229
1N4148
6215
1N4148
6218
1N4148
6216
1N4003
3219
680R
6217
1N4148
6219
5V6
2222
2n2/250V
2219
1000U/25V
2218
100U/25V
2221
100n/63V
2220
100n/63V
9102
3229
1K5
1202
T1.25A/250V
21/22 VERSION ONLY
J4
SFT
6214
1N4003
1N4148
6230
6213
1N4148
6210
1N4148
3231
10R
6231
1N4148
6228
1N4003
CN903
T-2H
CN904
T-2H
5220
1210
21/22 USE
LT-FILTER
C917
NC
9101
J055
RELY-8PIN
9106
J8MM
9213
F200mA/250V
J3
SFT
5204
1MH
2230
22N
3232
2M2
D939
1N4003
2231
220N/275V
7203
BC337-40
5206
100R
39V
6226
3221
2K2
2227
10N
9103
J055
6225
1N4148
2228
10N
5203
JA1631M
2225
100n/63V
3222
470R
3223
10K
6223
1N4148
5205
1MH
6220
1N4003
6221
1N4003
6222
1N4003
2229
47N
3226
330R
2224
100n/63V
6227
1N4148
2223
4n7/50V
2226
100U/100V

## PCB LAYOUT - POWER BOARD (BOTTOM VIEW)


3230
3217
3229
7206
7205

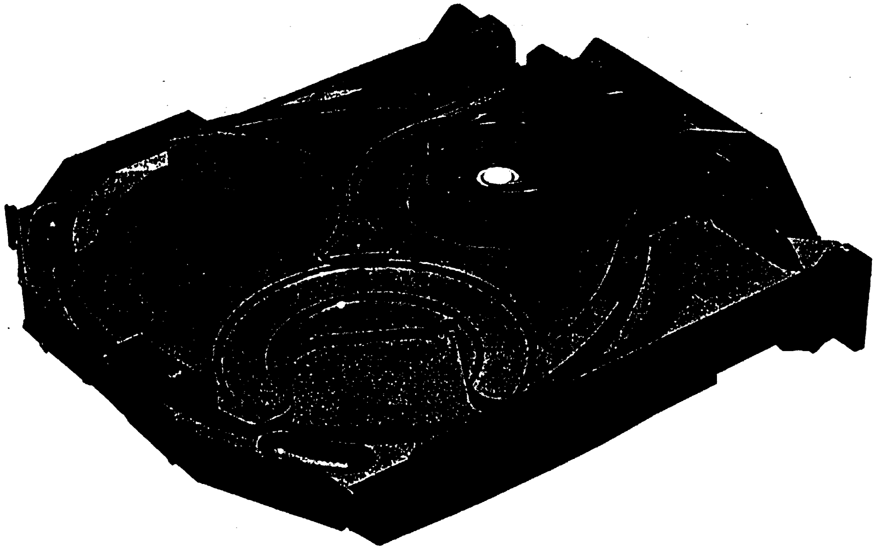
# CIRCUIT DIAGRAM - POWER BOARD


ECO BLOCK
CN903
L
N
CN904
5220
LT-FILTER
400MH
250V
C917
220N
(ONLY FOR /37)
3200
10M
1/2W
AGND
J905
FOR 22 VER
1202
T1A25/250V
J901
1205
ONLY FOR/21
J902
230
J903
240
127
5001
TRANSPOWER
02-SS-112L
1203
T1.25A/250V
1204
T200mA/250V
AGND
F2
F1
A2
NTC
10PIN2.0
CON1102
F2
F1
PWDN
5V6_ECO
LOW_PWR_CTR
NTC
CON1101
CON6P
J900
ONLY FOR/21
ONLY FOR/22
1210
LOW_PWR_CTR
6230
1N4148
3229
1K5
6213
1N4148
6210
1N4148
7202
8050
3217
47K
6214
1N4003
LPS
AGND
3214
100K
J904
6228
1N4003
6231
1N4148
3232
2M2
1/4W
2231
220N
250V
FOR37
2213
470N
250V
2230
22N
2232
100N
FOR37
5205
1MH
5204
1MH
9213
F200mA/250V
6223
1N4003
6222
1N4003
6221
1N4003
C928
47N
6220
1N4003
3231
10R
3213
A2
OPTION
3230
33K
AGND
6229
1N4148
3228
4K7
PWDN
LPS
6215
6216
1N4148
1N4148
3219
680R
5V6_ECO
6219
5V6
2219
100UF
6217
1N4148
6218
1N4148
2218
100UF
AGND
2221
100n
2220
100n
5203
2222
2n2
2224
47n
3226
330R
6227
1N4148
2223
4n7
3227
100K
2225
100n
7205
BC847B
7206
BC857B
3225
4M7
3233
33K
2226
100UF
3223
10K
3222
470R
7204
BC857B
6225
1N4148
6224
1n4003
2228
10n
3224
100K
2227
10N
7203
BC337B-40
6226
39V
3221
2K2
5206
100R
3220
1M

## *ELECTRICAL PARTS - POWER BOARD*

| | | | |
|---|---|---|---|
| 1206 | | 9940 000 01323 | SWITCH /21 |
| 1202 | ⚠ | 9940 000 01228 | FUSE RADIAL F200MA/250V |
| 1203 | ⚠ | 9940 000 01231 | FUSE RADIAL T1.25A 250V |
| 1204 | ⚠ | 9940 000 01229 | FUSE RADIAL T200MA/250V |
| 1210 | | 9940 000 01232 | RELAY ME-12H 30VDC |
| 2222 | ⚠ | 9940 000 01224 | SAFETY CAP 250V 0.0022µF +/-20% |
| 2231 | ⚠ | 9940 000 01225 | SAFETY CAP 275V 0.22µF +/-20% |
| 5203 | ⚠ | 9940 000 01227 | TRANSFORMER STANDBY |
| 5220 | ⚠ | 9940 000 01226 | AC LINE FILTER IND. 400µH 3A |
| 9213 | ⚠ | 9940 000 01228 | FUSE RADIAL F200MA/250V |
| C917 | ⚠ | 9940 000 01225 | SAFETY CAP 275V 0.22µF +/-20% |

**Note:** **Only these parts mentioned in the list are normal service parts.**



# 3CDC-LC-MP3CD2002

## (3 Disc Carousel Changer+MP3 Board) Layout stage .2

TABLE OF CONTENTS

Service Hints ........................................ 10-2
Wiring Diagram ........................................ 10-4
Blockdiagram ........................................ 10-5

CD Part
  Component Layout Main Board ........................ 10-6
  Circuit Diagram ........................................ 10-7

MP3 Part
  Component Layout Main Board ........................ 10-8
  Circuit Diagram ........................................ 10-9

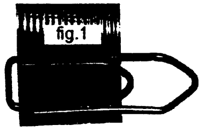
Exploded View ........................................ 10-10
Partslist ........................................ 10-12

## Service hints

### CAUTION

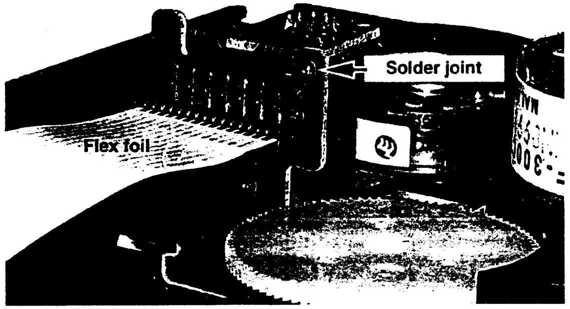
***CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CD MECHANISM. THAT'S WHY, BESIDES THE SAFETY MEASURES LIKE***
- ***SWITCH OFF POWER SUPPLY***
- ***ESD PROTECTION***

***ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.***



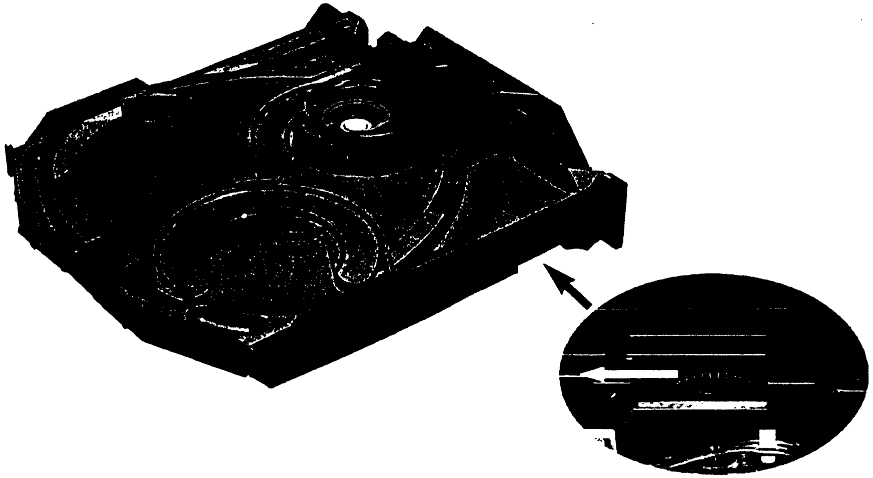
The following steps have to be done when replacing the CD mechanism:
1. Disconnect flexfoil cable from the old CD drive
2. Put a paperclip on the flexfoil to short-circuit the contacts (fig.1)
3. Remove the old CD drive
4. Remove paperclip from the flexfoil and connect it to the new drive
5. Position the new CD drive in its studs
6. Remove solder joint from the Laserunit

**Attention:** The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laserdiode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connection the drive to the set.



### Emergency open

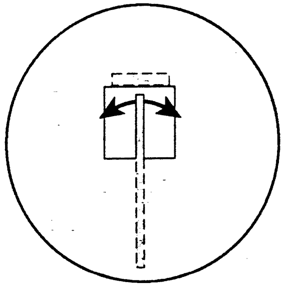
In case of a Supply fault, the tray can be opened manually.
1. Remove the top cover of the set to get access to the Changer Module.
2. Turn gearwheel clockwise (as shown in picture below).



## Service hints

### *Dismantling of Tray*

1. Open the tray.
2. Release 2x catch as shown in fig. 2 and Detail A
3. Pull tray out.



Detail A

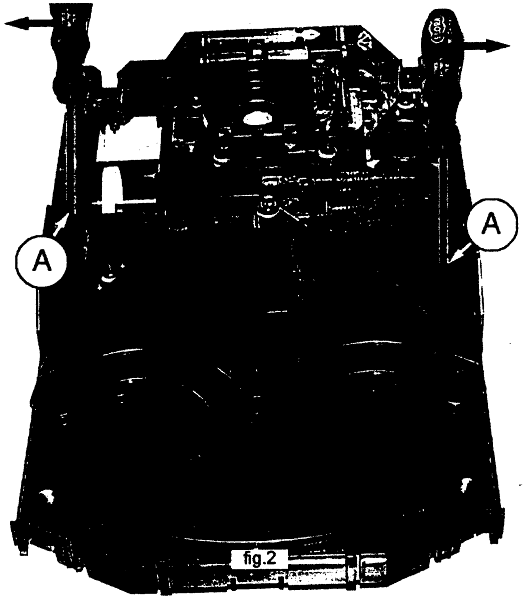
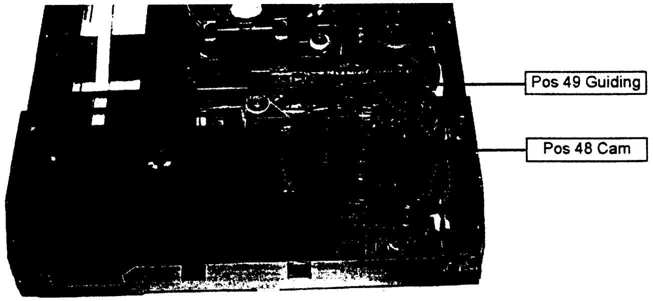
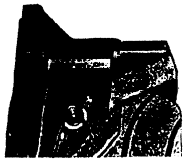


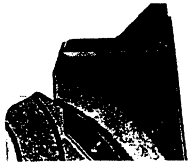
fig.2

## Assembling of Tray

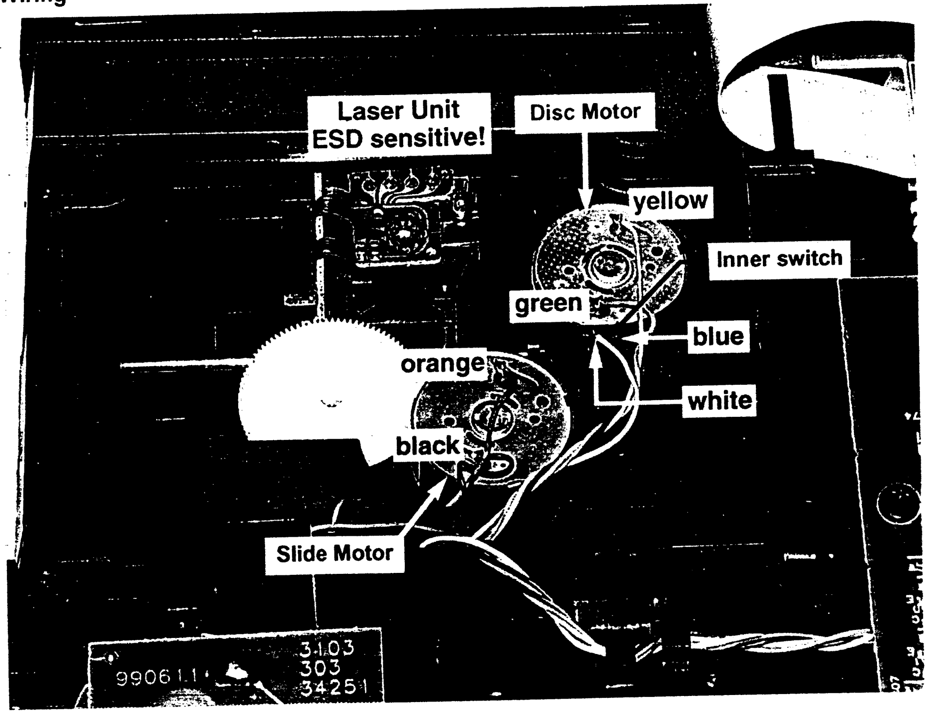
1. Turn Cam (pos. 48) clockwise to end position.
2. If necessary - move Guiding (pos. 49) to the right end position.
3. Insert the Tray.


Pos 49 Guiding
Pos 48 Cam

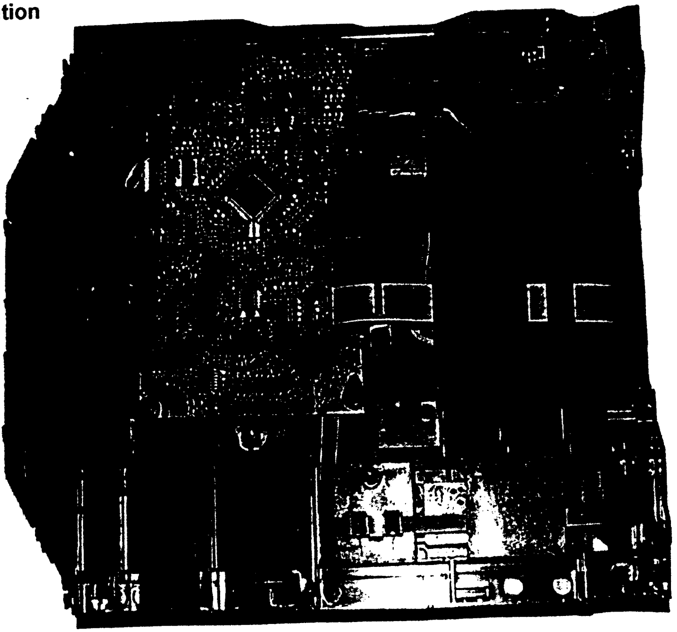




## Wiring

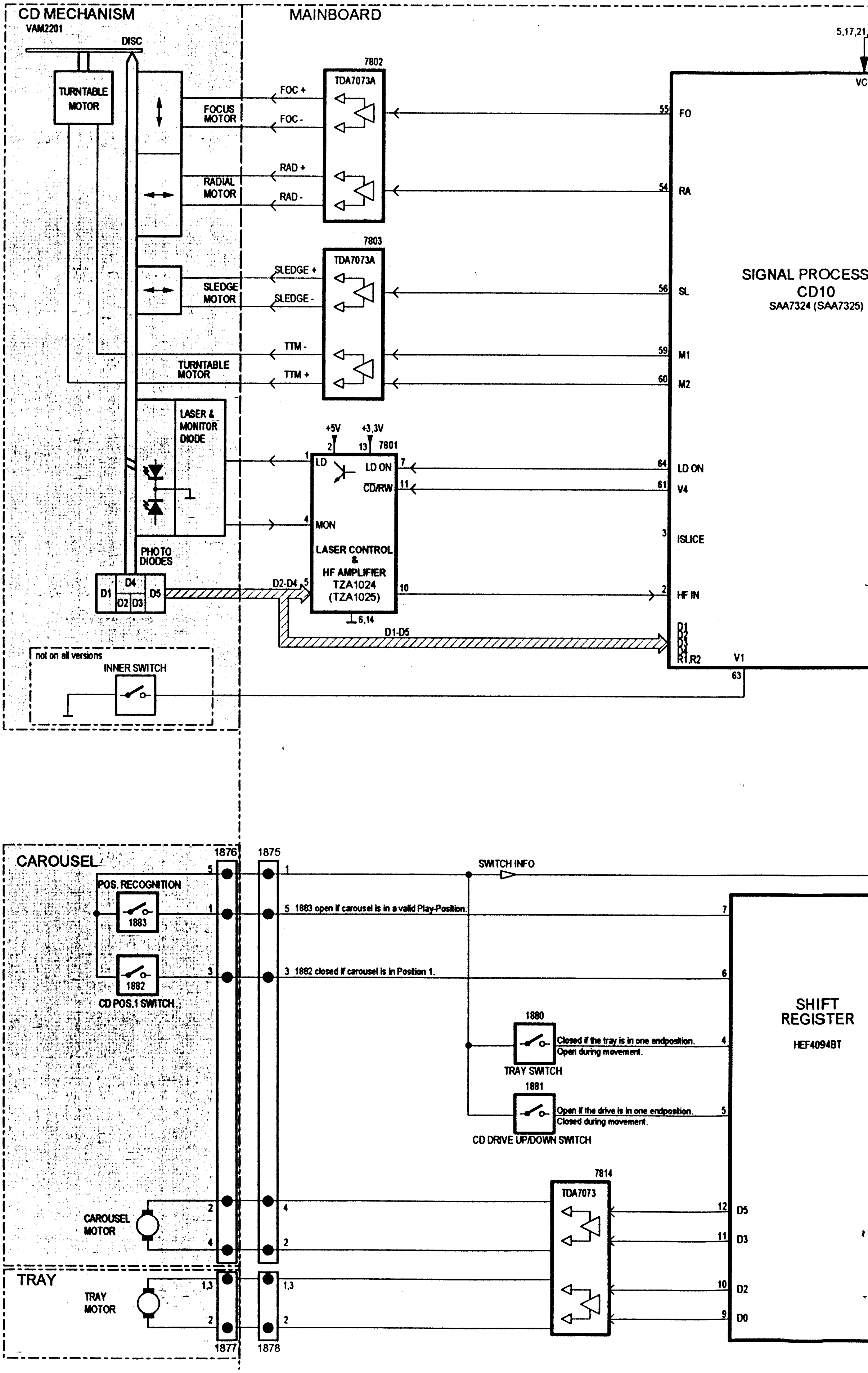

Laser Unit
ESD sensitive!
Disc Motor
yellow
Inner switch
green
blue
orange
white
black
Slide Motor
9906 1.1
3103
303
34251

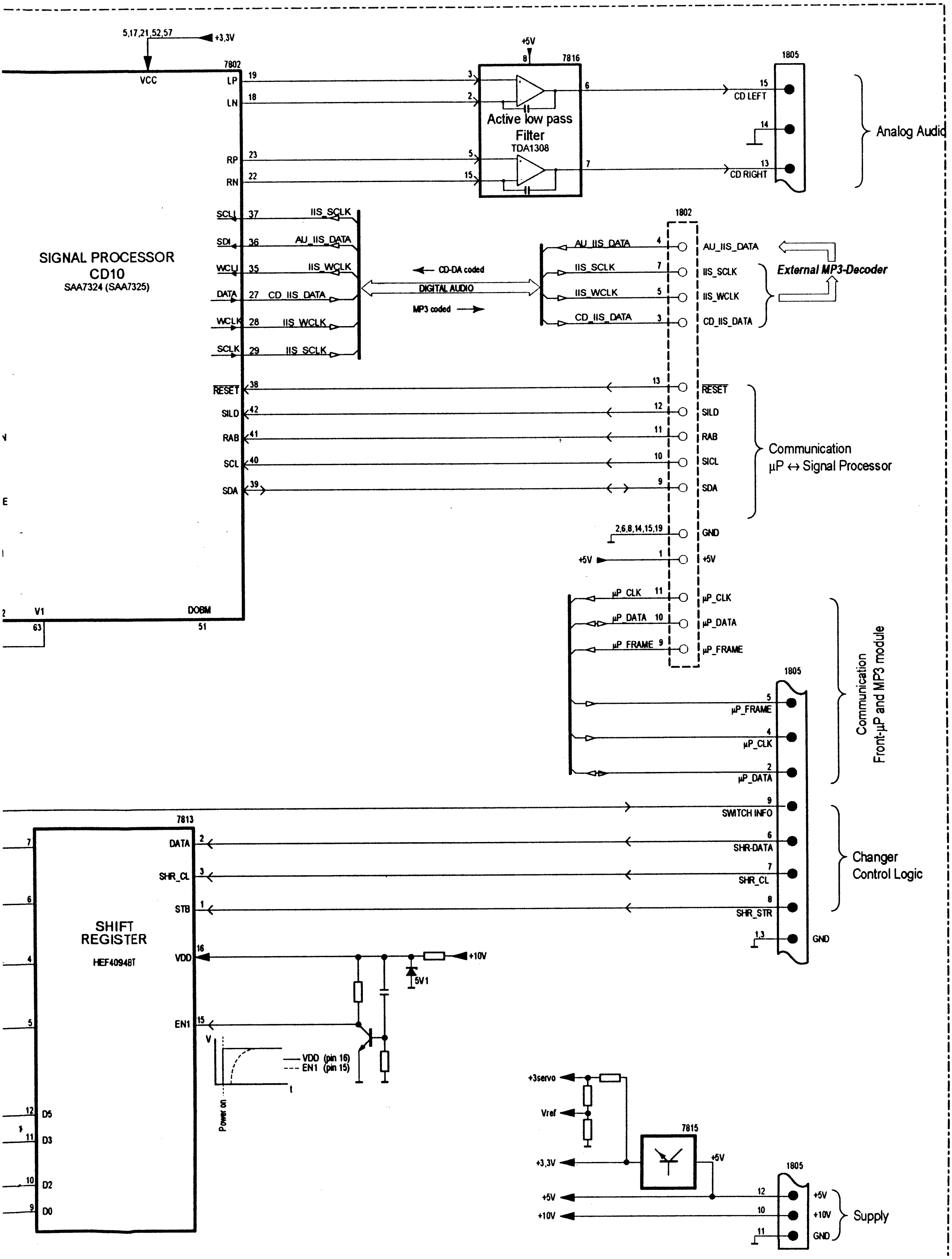
## Service Position



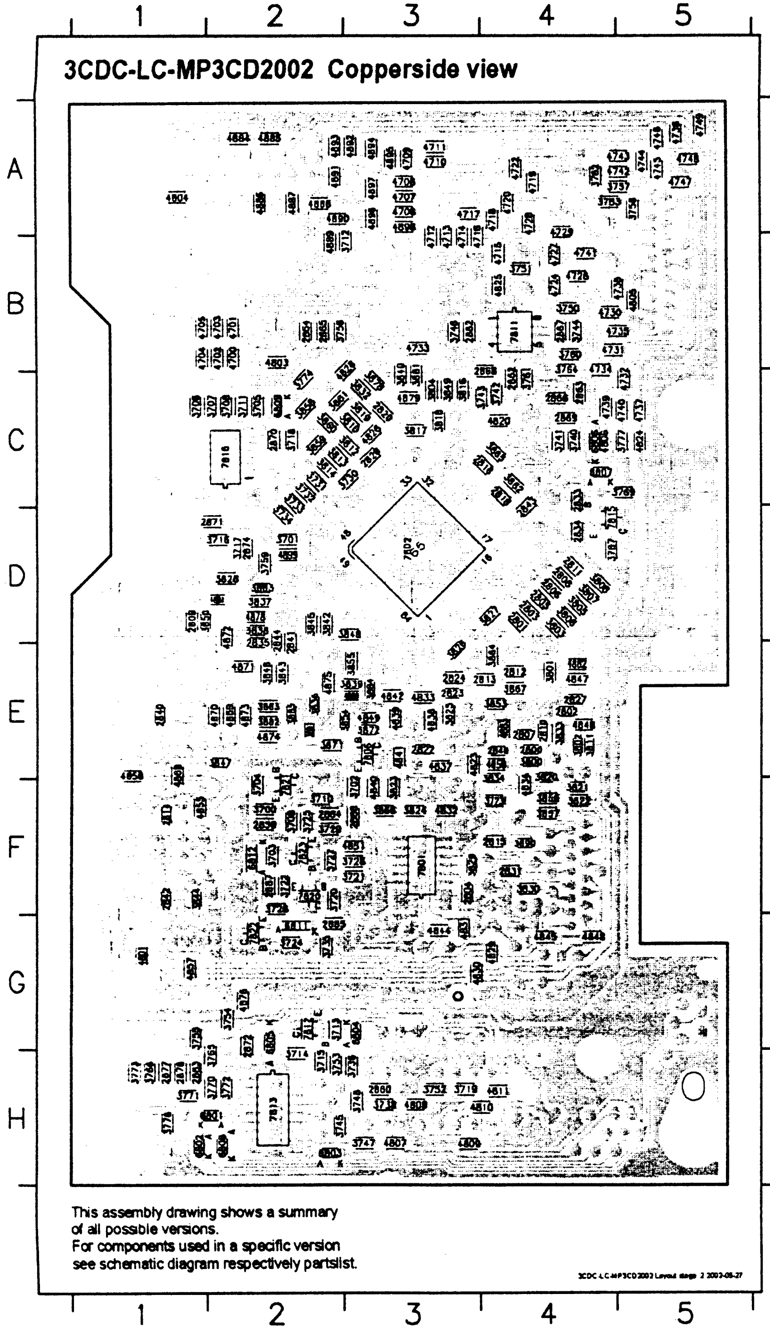
## Blockdiagram

### BLOCK DIAGRAM 3CDC-LC MP3 Version


CD MECHANISM
VAM2201
DISC
TURNTABLE MOTOR
FOCUS MOTOR
RADIAL MOTOR
SLEDGE MOTOR
TURNTABLE MOTOR
LASER & MONITOR DIODE
PHOTO DIODES
D1
D2
D3
D4
D5
not on all versions
INNER SWITCH
MAINBOARD
7802
TDA7073A
FOC +
FOC -
RAD +
RAD -
7803
TDA7073A
SLEDGE +
SLEDGE -
TTM -
TTM +
+5V
+3,3V
7801
LD
LD ON
CD/RW
MON
LASER CONTROL & HF AMPLIFIER
TZA1024 (TZA1025)
D2-D4
6,14
D1-D5
5,17,21
VC
SIGNAL PROCESS
CD10
SAA7324 (SAA7325)
FO
RA
SL
M1
M2
LD ON
V4
ISLICE
HF IN
D1
D2
D3
D4
R1,R2
V1
55
54
56
59
60
64
61
3
2
63
1
2
13
4
7
11
5
10
CAROUSEL
1876
1875
POS. RECOGNITION
1883
1882
CD POS.1 SWITCH
SWITCH INFO
5 1883 open if carousel is in a valid Play-Position.
3 1882 closed if carousel is in Position 1.
1880
Closed if the tray is in one endposition.
Open during movement.
TRAY SWITCH
1881
Open if the drive is in one endposition.
Closed during movement.
CD DRIVE UP/DOWN SWITCH
SHIFT REGISTER
HEF4094BT
7814
TDA7073
D5
D3
D2
D0
12
11
10
9
CAROUSEL MOTOR
TRAY
TRAY MOTOR
1,3
1877
1878


5,17,21,52,57
+3,3V
VCC
7802
SIGNAL PROCESSOR
CD10
SAA7324 (SAA7325)
LP 19
LN 18
RP 23
RN 22
SCLI 37 IIS_SCLK
SDI 36 AU_IIS_DATA
WCLI 35 IIS_WCLK
DATA 27 CD_IIS_DATA
WCLK 28 IIS_WCLK
SCLK 29 IIS_SCLK
CD-DA coded
DIGITAL AUDIO
MP3 coded
+5V
8
7816
Active low pass Filter
TDA1308
3
2
5
15
6
7
1805
15 CD LEFT
14
13 CD RIGHT
Analog Audio
1802
AU_IIS_DATA 4 AU_IIS_DATA
IIS_SCLK 7 IIS_SCLK
IIS_WCLK 5 IIS_WCLK
CD_IIS_DATA 3 CD_IIS_DATA
External MP3-Decoder
RESET 38 13 RESET
SILD 42 12 SILD
RAB 41 11 RAB
SCL 40 10 SICL
SDA 39 9 SDA
Communication
µP ↔ Signal Processor
2,6,8,14,15,19 GND
+5V 1 +5V
µP_CLK 11 µP_CLK
µP_DATA 10 µP_DATA
µP_FRAME 9 µP_FRAME
V1 63
DOBM 51
1805
5 µP_FRAME
4 µP_CLK
2 µP_DATA
Communication
Front-µP and MP3 module
9 SWITCH INFO
6 SHR-DATA
7 SHR_CL
8 SHR_STR
1,3 GND
Changer
Control Logic
7813
SHIFT
REGISTER
HEF4094BT
DATA 2
SHR_CL 3
STB 1
VDD 16
EN1 15
+10V
5V1
V
t
VDD (pin 16)
EN1 (pin 15)
Power on
7
6
4
5
12 D5
11 D3
10 D2
9 D0
+3servo
Vref
+3,3V
7815
+5V
+5V
+10V
1805
12 +5V
10 +10V
11 GND
Supply

## 3CDC-LC-MP3CD2002 Copperside view

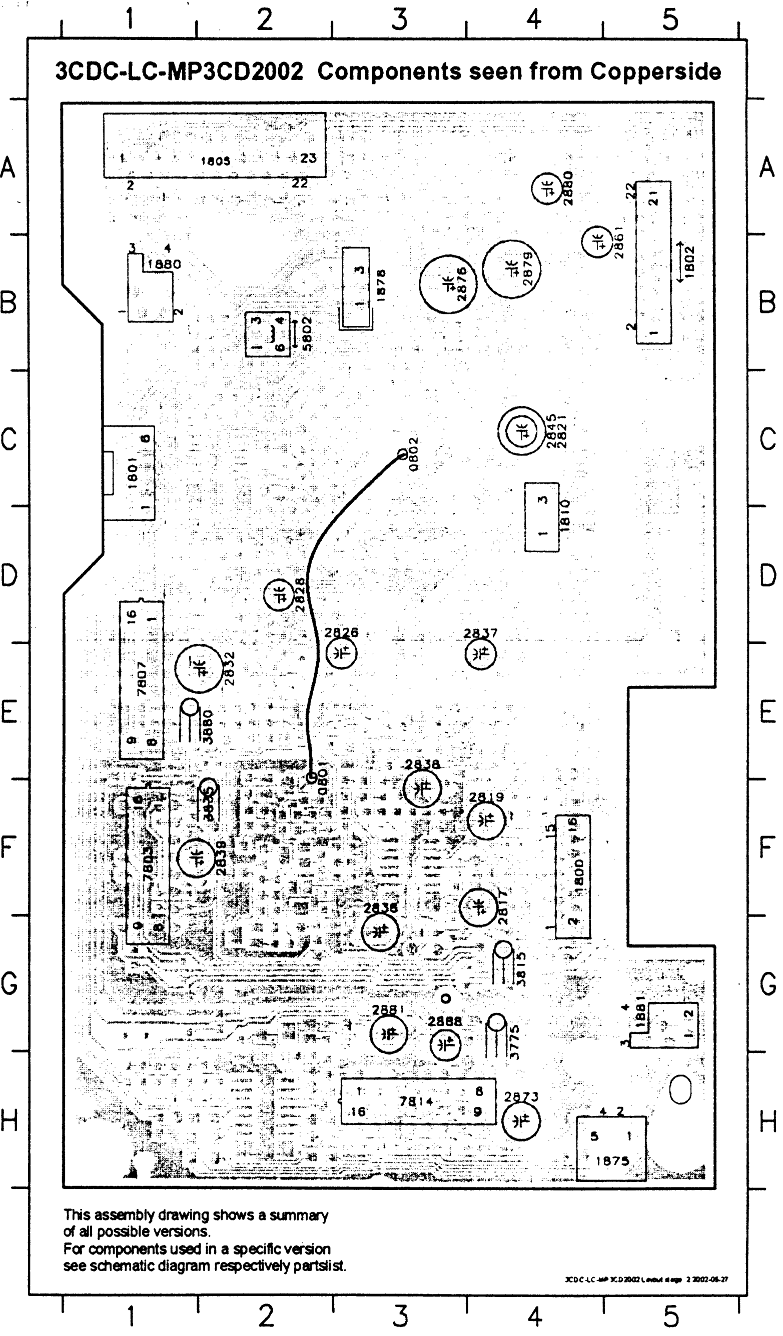


This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

## Mapping

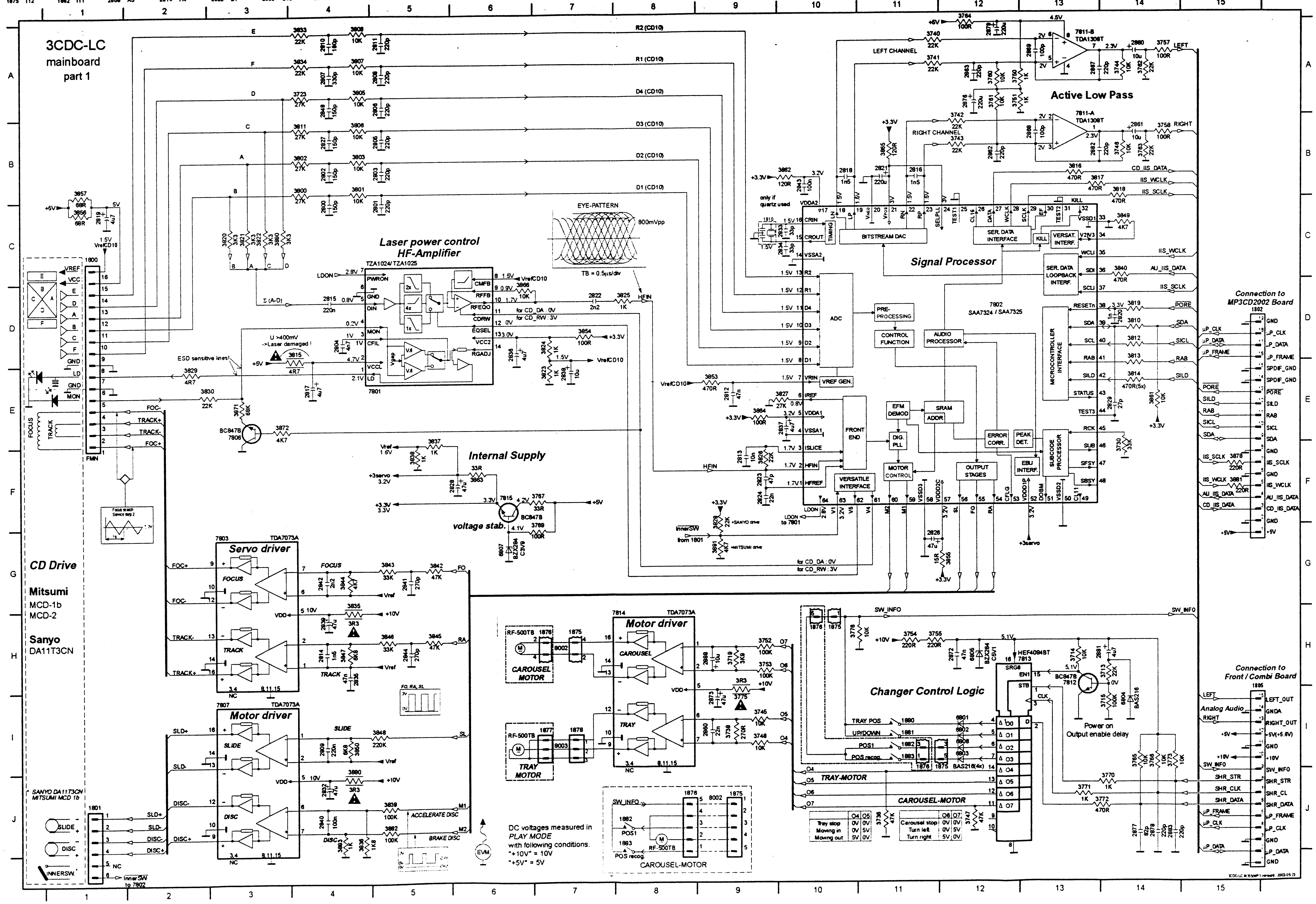
| Copperside | | | | | | | | Componentside | |
|---|---|---|---|---|---|---|---|---|---|
| 2800 | E4 | 3730 | C3 | 3848 | D3 | 4823 | E3 | 1451 | B5 |
| 2801 | D4 | 3731 | C2 | 3849 | C3 | 4824 | C5 | 1455 | A4 |
| 2802 | E4 | 3732 | C2 | 3850 | D1 | 4825 | B4 | 2450 | C1 |
| 2803 | D4 | 3733 | C2 | 3853 | E4 | 4826 | C3 | 2451 | B1 |
| 2804 | F3 | 3734 | D2 | 3854 | E3 | 4828 | C3 | 2452 | C2 |
| 2805 | D4 | 3735 | G2 | 3855 | E3 | 4829 | G4 | 2453 | B1 |
| 2806 | D4 | 3736 | H3 | 3856 | F4 | 4830 | G3 | 2454 | B1 |
| 2807 | E4 | 3738 | H3 | 3857 | F4 | 4831 | G3 | 2455 | D2 |
| 2808 | D4 | 3740 | C4 | 3858 | C2 | 4832 | F3 | 2457 | A2 |
| 2809 | D1 | 3741 | C4 | 3859 | C2 | 4833 | E3 | 2461 | D4 |
| 2810 | E4 | 3742 | C4 | 3860 | C2 | 4834 | F4 | 2463 | A3 |
| 2811 | D4 | 3743 | C4 | 3861 | C2 | 4837 | E3 | 2464 | D4 |
| 2812 | E4 | 3744 | B4 | 3862 | C4 | 4838 | E3 | 2465 | D4 |
| 2813 | E4 | 3745 | H2 | 3863 | D2 | 4839 | E3 | 2466 | A3 |
| 2814 | F1 | 3746 | B3 | 3864 | E4 | 4840 | F3 | 2467 | B4 |
| 2815 | F4 | 3747 | H3 | 3865 | C4 | 4841 | E3 | 2468 | B4 |
| 2816 | C4 | 3748 | H3 | 3866 | F3 | 4842 | E3 | 2469 | B4 |
| 2818 | C4 | 3750 | B4 | 3867 | E4 | 4844 | G3 | 2472 | D3 |
| 2820 | C3 | 3751 | B4 | 3871 | E2 | 4845 | G4 | 3450 | C1 |
| 2822 | E3 | 3752 | H3 | 3872 | E3 | 4846 | E4 | 3451 | B1 |
| 2823 | E3 | 3753 | H2 | 3878 | C3 | 4847 | E4 | 3454 | D2 |
| 2824 | E3 | 3754 | G2 | 3881 | C3 | 4848 | G4 | 3465 | C1 |
| 2827 | E4 | 3755 | G1 | 3882 | E2 | 4849 | E3 | 3467 | A3 |
| 2829 | C3 | 3756 | B2 | 3883 | E2 | 4851 | F3 | 3468 | A3 |
| 2831 | F4 | 3757 | A5 | 3884 | E3 | 4855 | F1 | 3469 | C4 |
| 2833 | C4 | 3758 | A5 | 3885 | E2 | 4856 | E4 | 3470 | D3 |
| 2834 | D4 | 3759 | D2 | 3890 | F4 | 4857 | G1 | 3471 | C4 |
| 2835 | D2 | 3760 | B4 | 3891 | E2 | 4858 | E1 | 3473 | C4 |
| 2840 | E1 | 3761 | C4 | 4700 | B2 | 4868 | E1 | 3474 | A3 |
| 2841 | D2 | 3762 | A4 | 4701 | B2 | 4869 | E2 | 3475 | C4 |
| 2842 | F1 | 3763 | A4 | 4702 | B2 | 4870 | E2 | 3476 | C4 |
| 2843 | D4 | 3764 | C4 | 4703 | B2 | 4871 | E2 | 3477 | B4 |
| 2844 | D2 | 3765 | H2 | 4704 | B1 | 4872 | D2 | 3479 | A2 |
| 2848 | E4 | 3766 | H1 | 4705 | B1 | 4873 | E2 | 3480 | C4 |
| 2859 | F2 | 3767 | D4 | 4706 | A3 | 4874 | E2 | 3481 | C4 |
| 2860 | H3 | 3769 | C5 | 4707 | A3 | 4875 | E2 | 3484 | B4 |
| 2862 | C4 | 3770 | H2 | 4708 | A3 | 4876 | G2 | 3490 | A4 |
| 2863 | C4 | 3771 | H1 | 4709 | A3 | 4878 | D2 | 3494 | A2 |
| 2864 | B2 | 3772 | H2 | 4710 | A3 | 4879 | C3 | 3496 | A4 |
| 2865 | B2 | 3773 | H1 | 4711 | A3 | 4880 | E3 | 3499 | C1 |
| 2866 | C4 | 3774 | C2 | 4712 | B3 | 4881 | D2 | 4450 | A4 |
| 2867 | B4 | 3776 | H1 | 4713 | B3 | 4882 | E4 | 6451 | D4 |
| 2868 | C4 | 3777 | C5 | 4714 | B3 | 4883 | E4 | 7451 | B3 |
| 2869 | C4 | 3800 | E4 | 4715 | B4 | 4884 | A2 | 7456 | D4 |
| 2870 | C2 | 3801 | E4 | 4716 | B3 | 4885 | A2 | 7458 | D1 |
| 2871 | D2 | 3802 | E4 | 4717 | A3 | 4886 | A2 | | |
| 2872 | G2 | 3803 | D4 | 4718 | A4 | 4887 | A2 | | |
| 2874 | D2 | 3804 | C3 | 4719 | A4 | 4888 | A2 | | |
| 2877 | H1 | 3805 | D4 | 4720 | A4 | 4889 | B2 | | |
| 2878 | H1 | 3806 | D4 | 4722 | A4 | 4890 | A2 | | |
| 2882 | B3 | 3807 | D4 | 4724 | B4 | 4891 | A2 | | |
| 2883 | H1 | 3808 | D4 | 4726 | B4 | 4892 | A3 | | |
| 2884 | F2 | 3810 | C3 | 4727 | B4 | 4893 | A2 | | |
| 2885 | G2 | 3811 | E4 | 4728 | A4 | 4894 | A3 | | |
| 2886 | F3 | 3812 | C3 | 4729 | A4 | 4895 | A3 | | |
| 2887 | F2 | 3813 | C2 | 4730 | B4 | 4896 | A3 | | |
| 3700 | F2 | 3814 | C2 | 4731 | B4 | 4897 | A3 | | |
| 3701 | D2 | 3816 | C3 | 4732 | C5 | 4898 | A3 | | |
| 3702 | F3 | 3817 | C3 | 4733 | B3 | 4899 | D2 | | |
| 3703 | F2 | 3818 | C3 | 4734 | C4 | 6801 | H2 | | |
| 3704 | F2 | 3819 | C3 | 4735 | B5 | 6802 | H1 | | |
| 3705 | C2 | 3820 | E4 | 4736 | A5 | 6803 | H2 | | |
| 3706 | C1 | 3821 | F4 | 4737 | C5 | 6804 | G3 | | |
| 3707 | C2 | 3822 | F4 | 4738 | B5 | 6805 | G2 | | |
| 3708 | C2 | 3823 | F3 | 4739 | C4 | 6806 | C4 | | |
| 3709 | F2 | 3824 | F3 | 4740 | C5 | 6807 | C4 | | |
| 3710 | F2 | 3825 | E3 | 4741 | B4 | 6808 | H2 | | |
| 3711 | C2 | 3826 | E3 | 4742 | A5 | 6809 | C2 | | |
| 3712 | B3 | 3827 | D4 | 4743 | A5 | 6811 | G2 | | |
| 3713 | G2 | 3828 | D2 | 4744 | A5 | 6812 | F2 | | |
| 3714 | H2 | 3829 | F3 | 4745 | A5 | 7801 | F3 | | |
| 3715 | H2 | 3830 | F4 | 4746 | A5 | 7802 | D3 | | |
| 3716 | D2 | 3832 | C3 | 4747 | A5 | 7806 | E3 | | |
| 3717 | D2 | 3833 | E4 | 4748 | A5 | 7811 | B4 | | |
| 3718 | C2 | 3834 | E4 | 4749 | A5 | 7812 | G2 | | |
| 3719 | H3 | 3836 | E2 | 4801 | G1 | 7813 | H2 | | |
| 3720 | F2 | 3837 | D2 | 4803 | B2 | 7815 | D4 | | |
| 3721 | F3 | 3838 | D2 | 4804 | A1 | 7816 | C2 | | |
| 3722 | F2 | 3839 | E3 | 4805 | B5 | 7820 | F2 | | |
| 3723 | F4 | 3840 | C3 | 4806 | C4 | 7821 | F2 | | |
| 3724 | G2 | 3842 | D2 | 4807 | H3 | 7822 | G2 | | |
| 3725 | F2 | 3843 | E2 | 4808 | H3 | 7823 | F2 | | |
| 3726 | F2 | 3844 | F1 | 4809 | H3 | | | | |
| 3727 | F2 | 3845 | D2 | 4810 | H4 | | | | |
| 3728 | F3 | 3846 | E2 | 4811 | H4 | | | | |
| 3729 | F2 | 3847 | E2 | 4820 | C4 | | | | |

## 3CDC-LC-MP3CD2002 Components seen from Copperside



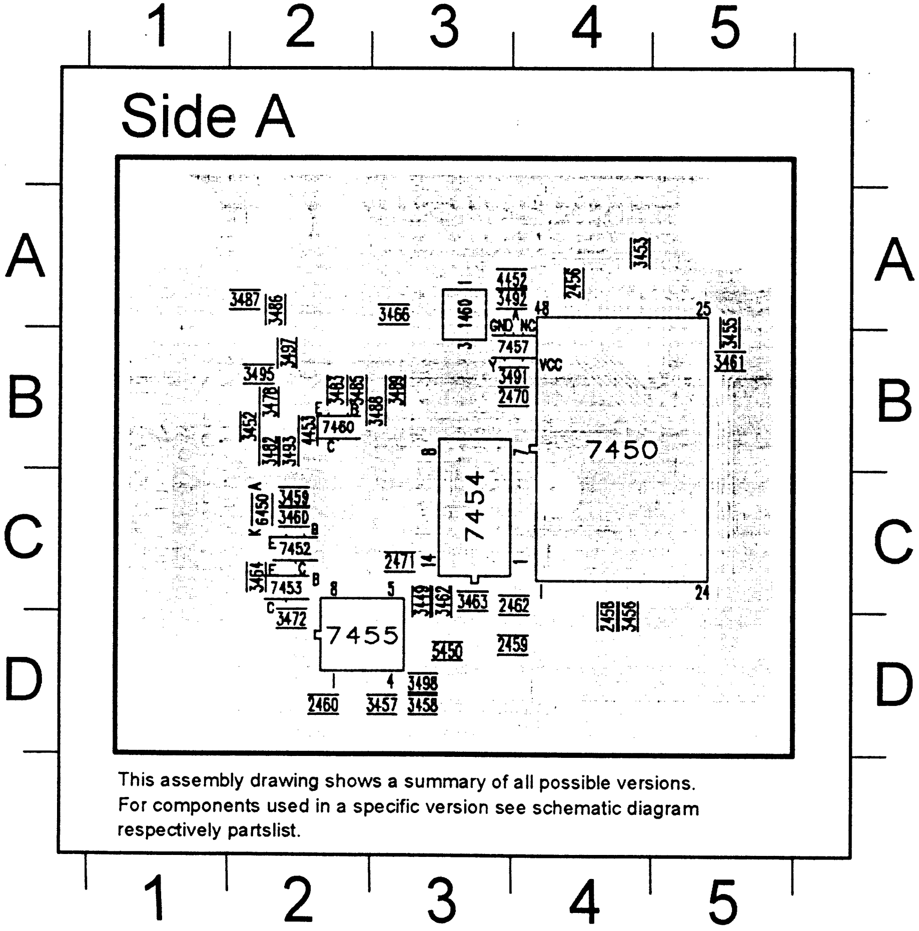
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

| | |
|---|---|
| 1800 | C1 |
| 1801 | J1 |
| 1802 | D15 |
| 1805 | I15 |
| 1810 | C9 |
| 1875 | H10 |
| 1875 | H7 |
| 1875 | I12 |
| 1876 | H10 |
| 1876 | H7 |
| 1876 | I11 |
| 1877 | I7 |
| 1878 | I7 |
| 1880 | I11 |
| 1881 | I11 |
| 1882 | I11 |
| 1883 | I11 |
| 2800 | C4 |
| 2801 | C5 |
| 2802 | B4 |
| 2803 | B5 |
| 2804 | D4 |
| 2805 | B5 |
| 2806 | A5 |
| 2807 | A4 |
| 2808 | A5 |
| 2809 | I4 |
| 2810 | A4 |
| 2811 | A5 |
| 2812 | E9 |
| 2813 | F9 |
| 2814 | H4 |
| 2815 | D4 |
| 2816 | B11 |
| 2817 | E4 |
| 2818 | B10 |
| 2819 | C1 |
| 2820 | D14 |
| 2821 | B11 |
| 2822 | D7 |
| 2823 | F9 |
| 2824 | F9 |
| 2826 | G11 |
| 2827 | B4 |
| 2828 | F6 |
| 2829 | E14 |
| 2832 | J4 |
| 2833 | C10 |
| 2834 | C10 |
| 2835 | H4 |
| 2836 | D6 |
| 2837 | E10 |
| 2838 | E7 |
| 2839 | H4 |
| 2840 | J4 |
| 2841 | G5 |
| 2842 | G4 |
| 2843 | B10 |
| 2844 | H5 |
| 2848 | A4 |
| 2860 | I9 |
| 2861 | B14 |
| 2862 | B12 |
| 2863 | A12 |
| 2867 | A13 |
| 2868 | B13 |
| 2869 | A13 |
| 2872 | H12 |
| 2873 | I9 |
| 2876 | A12 |
| 2877 | J14 |
| 2878 | J14 |
| 2879 | A12 |
| 2880 | A14 |
| 2881 | H14 |
| 2882 | B13 |
| 2883 | J14 |
| 2888 | H9 |
| 3713 | H14 |
| 3714 | H13 |
| 3715 | I14 |
| 3719 | H9 |
| 3723 | A4 |
| 3730 | F14 |
| 3736 | J11 |
| 3738 | I9 |
| 3740 | A11 |
| 3741 | A11 |
| 3742 | B12 |
| 3743 | B12 |
| 3744 | A14 |
| 3745 | I9 |
| 3746 | B14 |
| 3747 | J12 |
| 3748 | I9 |
| 3750 | A12 |
| 3751 | A12 |
| 3752 | H9 |
| 3753 | H9 |
| 3754 | H11 |
| 3755 | H11 |
| 3757 | A14 |
| 3758 | B14 |
| 3760 | A12 |
| 3761 | A12 |
| 3762 | A14 |
| 3763 | B14 |
| 3764 | A12 |
| 3765 | I14 |
| 3766 | I14 |
| 3767 | F7 |
| 3769 | G7 |
| 3770 | J14 |
| 3771 | J13 |
| 3772 | J14 |
| 3773 | I14 |
| 3775 | I9 |
| 3776 | H11 |
| 3800 | B4 |
| 3801 | B4 |
| 3802 | B4 |
| 3803 | B4 |
| 3805 | A4 |
| 3806 | B4 |
| 3807 | A4 |
| 3808 | A4 |
| 3810 | D14 |
| 3811 | B4 |
| 3812 | D14 |
| 3813 | E14 |
| 3814 | E14 |
| 3815 | D4 |
| 3816 | B13 |
| 3817 | B13 |
| 3818 | B14 |
| 3819 | D14 |
| 3820 | C3 |
| 3821 | C3 |
| 3822 | C3 |
| 3823 | E7 |
| 3824 | D7 |
| 3825 | D8 |
| 3826 | F9 |
| 3827 | E10 |
| 3828 | F9 |
| 3829 | E2 |
| 3830 | E2 |
| 3832 | E14 |
| 3833 | A4 |
| 3834 | A4 |
| 3835 | H4 |
| 3836 | J4 |
| 3837 | E5 |
| 3838 | F5 |
| 3839 | J5 |
| 3840 | C14 |
| 3842 | G5 |
| 3843 | G5 |
| 3844 | G4 |
| 3845 | H5 |
| 3846 | H5 |
| 3847 | H4 |
| 3848 | I5 |
| 3849 | C14 |
| 3850 | I4 |
| 3853 | E9 |
| 3854 | D7 |
| 3855 | G12 |
| 3856 | C1 |
| 3857 | B1 |
| 3861 | E14 |
| 3862 | B10 |
| 3863 | F6 |
| 3864 | E9 |
| 3865 | B11 |
| 3866 | D6 |
| 3871 | E3 |
| 3872 | E3 |
| 3878 | F15 |
| 3880 | J4 |
| 3881 | F15 |
| 3882 | J5 |
| 3883 | J4 |
| 3890 | C3 |
| 3891 | G9 |
| 6801 | I12 |
| 6802 | I12 |
| 6803 | I12 |
| 6804 | I14 |
| 6805 | H12 |
| 6807 | G6 |
| 6808 | I12 |
| 7801 | D5 |
| 7802 | D12 |
| 7803 | G3 |
| 7806 | E3 |
| 7807 | I3 |
| 7811-A | B13 |
| 7811-B | A13 |
| 7812 | H13 |
| 7813 | H13 |
| 7814 | H8 |
| 7815 | F6 |



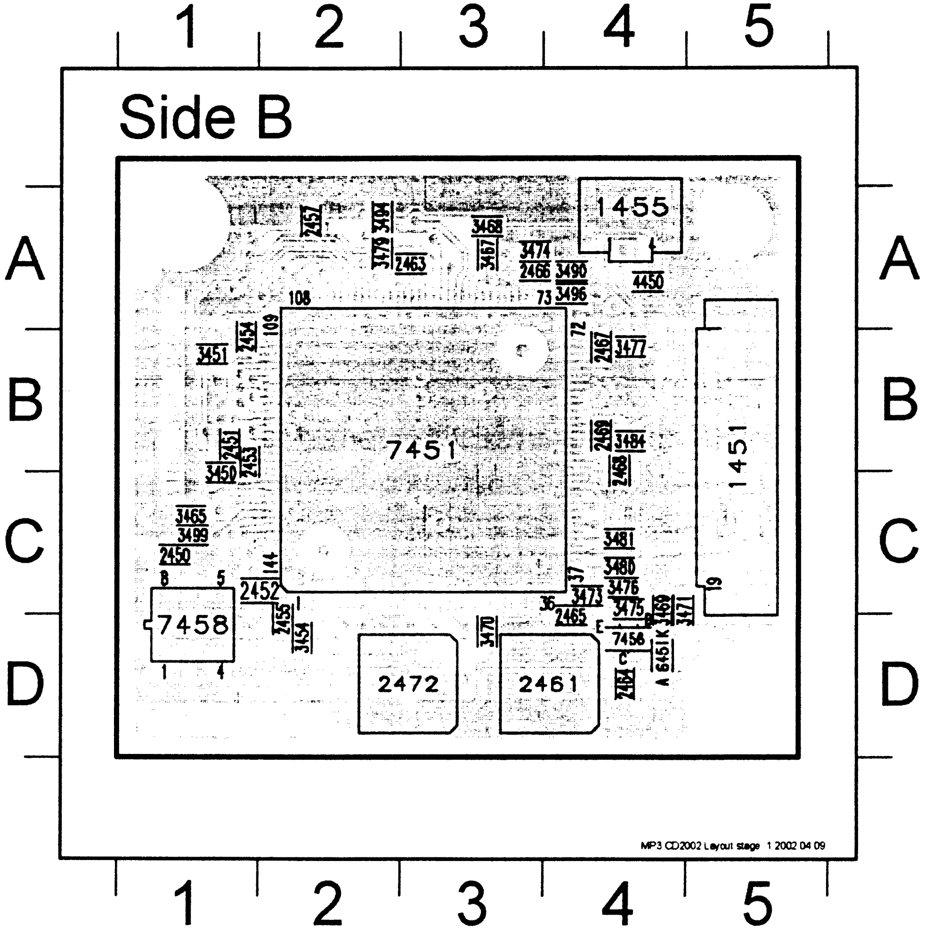
3CDC-LC
mainboard
part 1
Laser power control
HF-Amplifier
TZA1024/TZA1025
EYE-PATTERN
800mVpp
TB = 0.5µs/div
Signal Processor
7802
SAA7324 / SAA7325
Active Low Pass
7811-A TDA1308T
7811-B TDA1308T
LEFT CHANNEL
RIGHT CHANNEL
LEFT
RIGHT
BITSTREAM DAC
SER. DATA INTERFACE
KILL
VERSAT. INTERF.
SER. DATA LOOPBACK INTERF.
MICROCONTROLLER INTERFACE
ADC
PRE-PROCESSING
CONTROL FUNCTION
AUDIO PROCESSOR
VREF GEN.
FRONT END
EFM DEMOD
SRAM ADDR
DIG. PLL
MOTOR CONTROL
ERROR CORR.
PEAK DET.
OUTPUT STAGES
EBU INTERF.
SUBCODE PROCESSOR
VERSATILE INTERFACE
TIMING
only if quartz used
Internal Supply
voltage stab.
BC847B 7806
BC847B 7815
U >400mV ->Laser damaged !
ESD sensitive lines!
CD Drive
Mitsumi
MCD-1b
MCD-2
Sanyo
DA11T3CN
FMN
FOCUS
TRACK
Focus search
Servo driver
Motor driver
TDA7073A
FOCUS
TRACK
SLIDE
DISC
ACCELERATE DISC
BRAKE DISC
FO, RA, SL
* SANYO DA11T3CN
MITSUMI MCD 1b
SLIDE
DISC
INNERSW
InnerSW to 7802
for CD_DA : 0V
for CD_RW : 3V
InnerSW from 1801
LDON to 7801
Motor driver
TDA7073A
7814
RF-500TB
CAROUSEL MOTOR
TRAY MOTOR
CAROUSEL
TRAY
Changer Control Logic
HEF4094BT 7813
BC847B 7812
Power on
Output enable delay
TRAY POS
UP/DOWN
POS1
POS recog.
BAS216(4x)
TRAY-MOTOR
CAROUSEL-MOTOR
SW_INFO
CAROUSEL-MOTOR
Tray stop
Moving in
Moving out
O4 O5
0V 0V
0V 5V
5V 0V
Carousel stop
Turn left
Turn right
O6 O7
0V 0V
0V 5V
5V 0V
DC voltages measured in
PLAY MODE
with following conditions:
"+10V" = 10V
"+5V" = 5V
Connection to
MP3CD2002 Board
Connection to
Front / Combi Board
Analog Audio
GND
µP_CLK
µP_DATA
µP_FRAME
SPDIF_GND
PORE
SILD
RAB
SICL
SDA
IIS_SCLK
IIS_WCLK
AU_IIS_DATA
CD_IIS_DATA
+5V
LEFT_OUT
GNDA
RIGHT_OUT
+5V(+5.6V)
+10V
SW_INFO
SHR_STR
SHR_CL
SHR_DATA
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I J

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1460 | A3 | 3449 | C3 | 3460 | C2 | 3482 | B2 | 3492 | A3 | 6450 | C2 |
| 2456 | A4 | 3452 | B2 | 3461 | B5 | 3483 | B2 | 3493 | B2 | 7450 | B4 |
| 2458 | D4 | 3453 | A4 | 3462 | C3 | 3485 | B2 | 3495 | B2 | 7452 | C2 |
| 2459 | D4 | 3455 | B5 | 3463 | C3 | 3486 | A2 | 3497 | B2 | 7453 | C2 |
| 2460 | D2 | 3456 | D4 | 3464 | C2 | 3487 | A2 | 3498 | D3 | 7454 | C3 |
| 2462 | C4 | 3457 | D3 | 3466 | A3 | 3488 | B3 | 4452 | A3 | 7455 | D2 |
| 2470 | B4 | 3458 | D3 | 3472 | D2 | 3489 | B3 | 4453 | B2 | 7457 | B4 |
| 2471 | C3 | 3459 | C2 | 3478 | B2 | 3491 | B4 | 5450 | D3 | 7460 | B2 |


1
2
3
4
5
Side A
A
B
C
D
3487
3486
3466
1460
4452
3492
GND
NC
7457
VCC
3491
2470
2456
3453
48
25
3455
3461
3497
3495
3478
3483
3485
3488
3489
3452
3482
3493
4453
7460
7450
7454
6450
3459
3460
7452
3464
7453
3472
2471
7455
3449
3462
3463
2462
2458
3456
24
5450
2459
2460
3457
3498
3458

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1451 | B5 | 2457 | A2 | 2469 | B4 | 3469 | C4 | 3479 | A2 | 4450 | A4 |
| 1455 | A4 | 2461 | D4 | 2472 | D3 | 3470 | D3 | 3480 | C4 | 6451 | D4 |
| 2450 | C1 | 2463 | A3 | 3450 | C1 | 3471 | C4 | 3481 | C4 | 7451 | B3 |
| 2451 | B1 | 2464 | D4 | 3451 | B1 | 3473 | C4 | 3484 | B4 | 7456 | D4 |
| 2452 | C2 | 2465 | D4 | 3454 | D2 | 3474 | A3 | 3490 | A4 | 7458 | D1 |
| 2453 | B1 | 2466 | A3 | 3465 | C1 | 3475 | C4 | 3494 | A2 | | |
| 2454 | B1 | 2467 | B4 | 3467 | A3 | 3476 | C4 | 3496 | A4 | | |
| 2455 | D2 | 2468 | B4 | 3468 | A3 | 3477 | B4 | 3499 | C1 | | |


1
2
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5
Side B
A
B
C
D
2457
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3494
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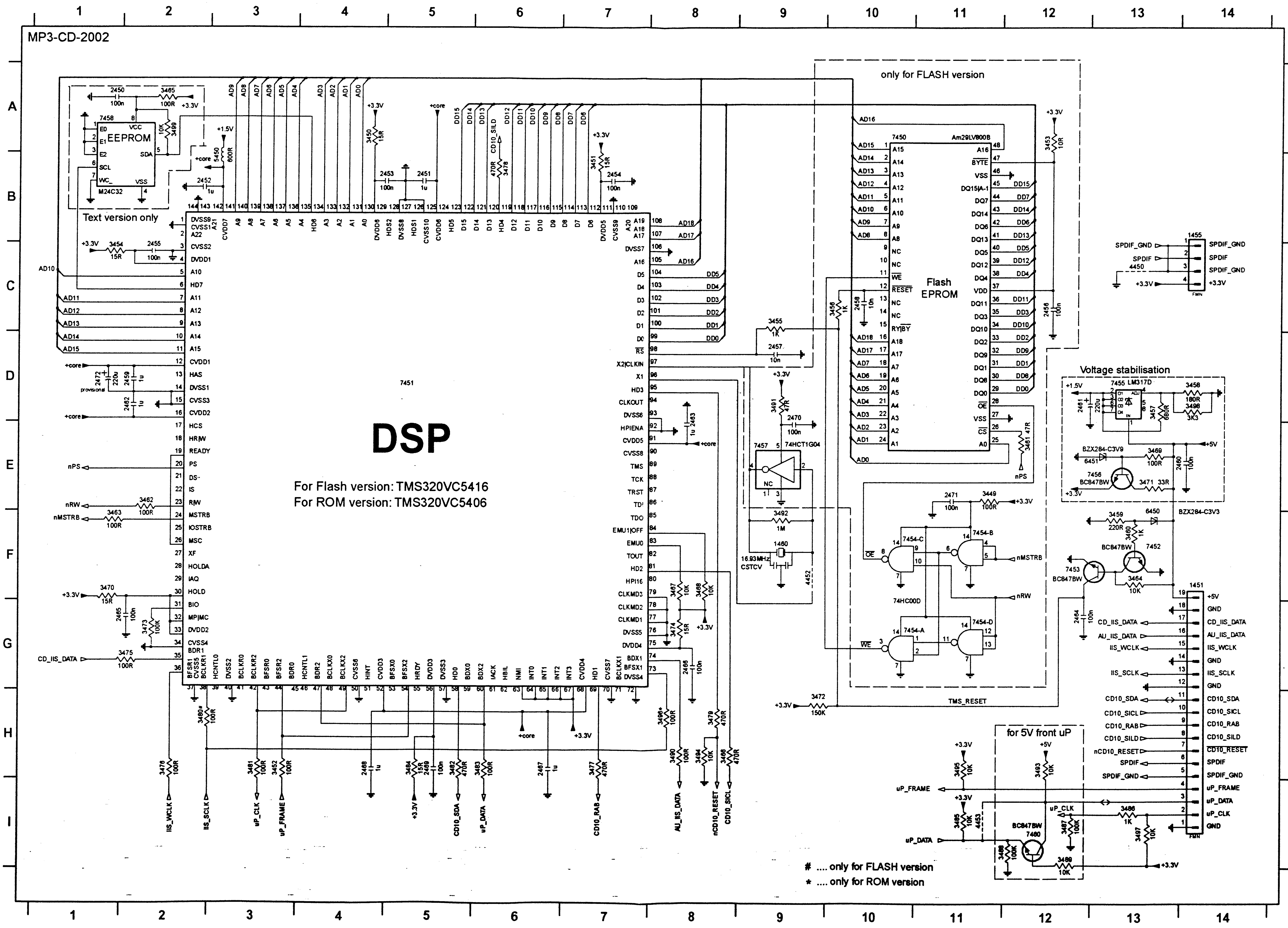
2464
19
MP3 CD2002 Layout stage 1 2002 04 09

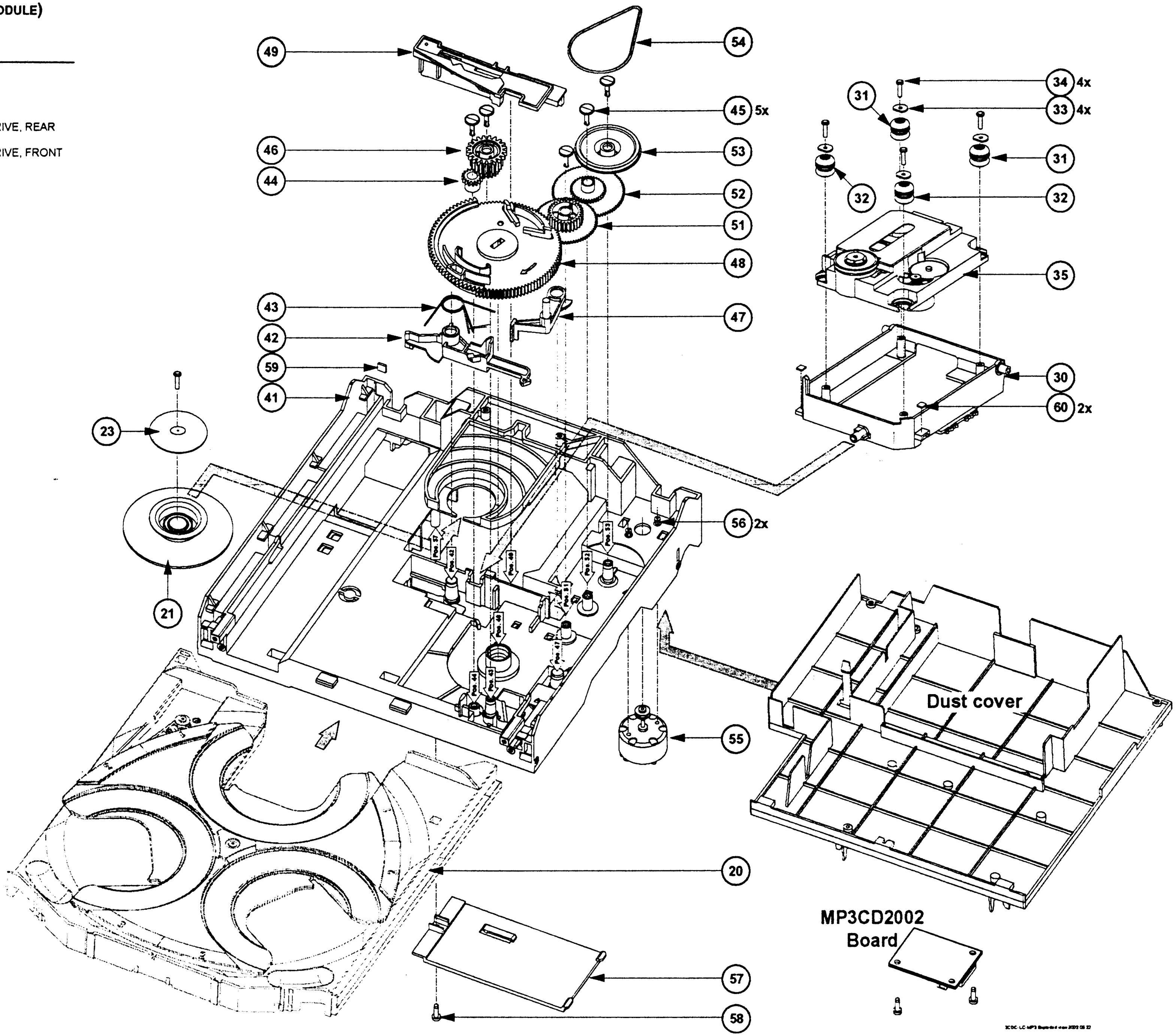

MP3-CD-2002
EEPROM
M24C32
Text version only
DSP
7451
For Flash version: TMS320VC5416
For ROM version: TMS320VC5406
only for FLASH version
7450
Am29LV800B
Flash EPROM
74HCT1G04
74HC00D
Voltage stabilisation
LM317D
for 5V front uP
BC847BW
16.93MHz CSTCV
1451
1455
# .... only for FLASH version
* .... only for ROM version

| | |
|---|---|
| 2451 | B5 |
| 2452 | B2 |
| 2453 | B4 |
| 2454 | B7 |
| 2455 | C2 |
| 2456 | C12 |
| 2457 | D9 |
| 2458 | C10 |
| 2459 | D2 |
| 2460 | E13 |
| 2461 | D12 |
| 2462 | D2 |
| 2463 | D8 |
| 2464 | G12 |
| 2465 | G2 |
| 2466 | G8 |
| 2467 | H6 |
| 2468 | H4 |
| 2469 | H5 |
| 2470 | D9 |
| 2471 | E11 |
| 2472 | D1 |
| 3449 | E11 |
| 3450 | A4 |
| 3451 | B7 |
| 3452 | H3 |
| 3453 | A12 |
| 3454 | C1 |
| 3455 | C9 |
| 3456 | C10 |
| 3457 | D13 |
| 3458 | D14 |
| 3459 | F13 |
| 3460 | F13 |
| 3461 | E12 |
| 3462 | E2 |
| 3463 | F1 |
| 3464 | F13 |
| 3465 | A2 |
| 3466 | H8 |
| 3467 | F8 |
| 3468 | F8 |
| 3469 | E13 |
| 3470 | F1 |
| 3471 | E13 |
| 3472 | H9 |
| 3473 | G2 |
| 3474 | G8 |
| 3475 | G2 |
| 3476 | H2 |
| 3477 | H7 |
| 3478 | B6 |
| 3479 | H8 |
| 3480 | H2 |
| 3481 | H3 |
| 3482 | H5 |
| 3483 | H6 |
| 3484 | H5 |
| 3485 | I11 |
| 3486 | I13 |
| 3487 | I12 |
| 3488 | I12 |
| 3489 | I12 |
| 3490 | H8 |
| 3491 | D9 |
| 3492 | F9 |
| 3493 | H12 |
| 3494 | H8 |
| 3495 | H11 |
| 3496 | H8 |
| 3497 | I13 |
| 3498 | D14 |
| 3499 | A2 |
| 4450 | C13 |
| 4452 | F9 |
| 4453 | I11 |
| 5450 | B3 |
| 6450 | E13 |
| 6451 | E13 |
| 7450 | A10 |
| 7451 | D5 |
| 7452 | F13 |
| 7453 | F12 |
| 7454-A | G11 |
| 7454-B | F11 |
| 7454-C | F11 |
| 7454-D | G11 |
| 7455 | D13 |
| 7456 | E12 |
| 7457 | E9 |
| 7458 | A1 |
| 7460 | I12 |

## EXPLODED VIEW (3CDC-LC MODULE)

MECHANICAL PARTS *Loader*

| | | |
|---|---|---|
| 20 | 3103 304 66500 | DRAWER BLACK |
| 21 | 3140 114 29070 | PRESSURE RING-DA11 |
| 23 | 3140 111 21270 | METAL RING-DA11 |
| 30 | 3103 304 66560 | SUPPORT |
| 31 | 4822 529 10386 | RUBBER DAMPER CD DRIVE, REAR |
| 32 | 4822 529 10387 | RUBBER DAMPER CD DRIVE, FRONT |
| 33 | 3103 304 06970 | WASHER |
| 35 | 3103 309 05350 | CD DRIVE MCD1B |
| 41 | 3103 304 66480 | FRAME |
| 42 | 3103 304 66540 | BRACKET-GUIDING |
| 43 | 3103 301 06460 | SPRING-GUIDING |
| 44 | 3103 304 06890 | GEAR-3 |
| 45 | 3103 304 06980 | NAIL FIXATION |
| 46 | 3103 304 06880 | GEAR-2 |
| 47 | 3103 304 66530 | BRACKET-LOAD |
| 48 | 3103 304 06910 | CAM |
| 49 | 3103 304 66510 | GUIDING |
| 51 | 3103 304 06900 | GEAR-4 |
| 52 | 3103 304 06870 | GEAR-1 |
| 53 | 3103 304 06960 | PULLEY-FRAME |
| 54 | 3103 304 66910 | DRIVING-BELT-DRAWER |
| 55 | 4822 361 10753 | TRAY MOTOR |
| 56 | 4822 502 12548 | SCREW M2,6X3,5 |
| 57 | 3103 304 69880 | COVER-DA11 |
| 59 | 4822 466 12146 | RUBBER |


49
54
34 4x
31
33 4x
45 5x
46
53
44
52
32
31
32
51
48
35
43
47
42
59
41
30
60 2x
23
56 2x
21
Dust cover
55
20
MP3CD2002
Board
57
58

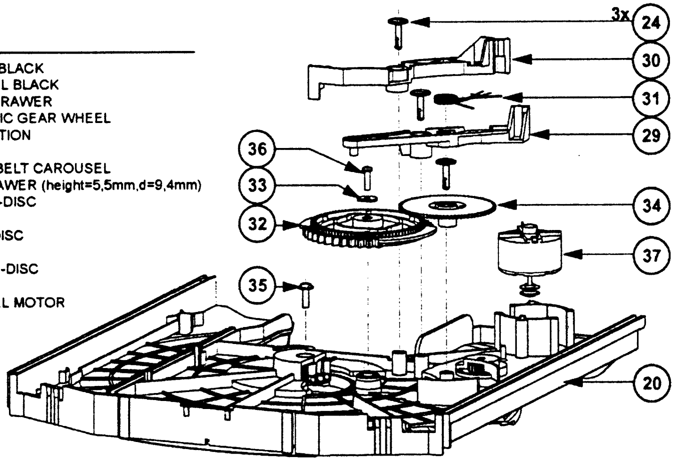
Ⓧ spare part

Ⓨ non spare part

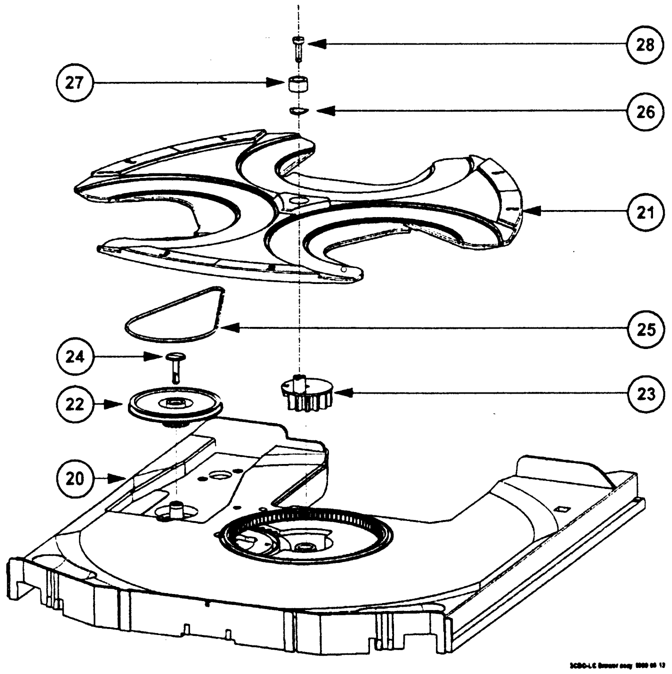
## Drawer bottom view

MECHANICAL PARTS *Drawer*

| | | |
|---|---|---|
| 20 | 3103 304 66500 | DRAWER BLACK |
| 21 | 3103 304 66490 | CAROUSEL BLACK |
| 22 | 3103 304 06860 | PULLEY-DRAWER |
| 23 | 3103 304 06850 | ECCENTRIC GEAR WHEEL |
| 24 | 3103 304 06980 | NAIL FIXATION |
| 25 | 3103 304 66850 | DRIVING BELT CAROUSEL |
| 27 | 4822 532 12365 | BUSH DRAWER (height=5,5mm,d=9,4mm) |
| 29 | 3103 304 66550 | BRACKET-DISC |
| 30 | 3103 304 66520 | TUMBLER |
| 31 | 3103 301 06470 | SPRING-DISC |
| 32 | 3103 304 06920 | CONTROL-DISC |
| 34 | 3103 304 06870 | GEAR-1 |
| 37 | 4822 361 10753 | CAROUSEL MOTOR |



## Drawer top view



Ⓧ spare part

Ⓨ non spare part

***ELECTRICAL PARTSLIST 3CDC-LC MODULE***

MISCELLANEOUS

| | | |
|---|---|---|
| 37 | 4822 361 10753 | CAROUSEL MOTOR |
| 55 | 4822 361 10753 | TRAY MOTOR |
| 1800 | 2422 025 17389 | FFC-CONNECTOR 16Pin |
| 1805 | 4822 265 10979 | FFC-CONNECTOR 15Pin |
| 1875 | 4822 267 10958 | FFC-CONNECTOR 5Pin |
| 1876 | 2422 025 08332 | FFC-CONNECTOR 5Pin |
| 1880 | 4822 276 13503 | SWITCH |
| 1881 | 4822 276 13503 | SWITCH |
| 1882 | 4822 276 13503 | SWITCH |
| 1883 | 4822 276 13503 | SWITCH |
| 8001 | 3103 308 93070 | FLEX FOIL CABLE 19P, 170mm BD |
| 8002 | 3103 308 91990 | FLEXFOIL CABLE, 5P, 200mm AD |
| 8005 | 3103 308 92930 | FLEX FOIL CABLE 16P 170mm 1:n |

CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2800© | 4822 122 33753 | 150pF | 5% | 50V |
| 2801© | 4822 126 13883 | 220pF | 5% | 50V |
| 2802© | 4822 122 33753 | 150pF | 5% | 50V |
| 2803© | 4822 126 13883 | 220pF | 5% | 50V |
| 2804© | 4822 126 13193 | 4,7nF | 10% | 63V |
| 2805© | 4822 126 13883 | 220pF | 5% | 50V |
| 2806© | 4822 126 13883 | 220pF | 5% | 50V |
| 2807© | 4822 126 14241 | 330pF | | 50V |
| 2808© | 4822 126 13883 | 220pF | 5% | 50V |
| 2809© | 4822 126 13879 | 220nF | 20% | 16V |
| 2810© | 4822 126 14508 | 180pF | 5% | 50V |
| 2811© | 4822 126 13883 | 220pF | 5% | 50V |
| 2812© | 3198 024 44730 | 47nF | 5% | 50V |
| 2813© | 4822 122 33177 | 10nF | 20% | 50V |
| 2814© | 4822 126 14247 | 1,5nF | 10% | 50V |
| 2815© | 4822 126 14076 | 220nF | 20% | 25V |
| 2816© | 4822 126 13344 | 1,5nF | 5% | 63V |
| 2817 | 4822 124 40769 | 4,7µF | 20% | 100V |
| 2818© | 4822 126 13344 | 1,5nF | 5% | 63V |
| 2819 | 4822 124 40769 | 4,7µF | 20% | 100V |
| 2820© | 5322 126 11578 | 1nF | 10% | 63V |
| 2821 | 4822 124 42383 | 220µF | 20% | 4V |
| 2822© | 4822 126 14238 | 2,2nF | 10% | 50V |
| 2823© | 4822 126 11785 | 47pF | 5% | 50V |
| 2824© | 5322 122 32654 | 22nF | 10% | 63V |
| 2826 | 4822 124 12362 | 47µF | 20% | 4V |
| 2827© | 4822 122 33753 | 150pF | 5% | 50V |
| 2828 | 4822 124 12362 | 47µF | 20% | 4V |
| 2829© | 4822 126 11669 | 27pF | 10% | 50V |
| 2832 | 4822 124 40433 | 47µF | 20% | 25V |
| 2833© | 2222 867 15339 | 33pF | 5% | 50V |
| 2835© | 3198 024 44730 | 47nF | 5% | 50V |
| 2836 | 4822 124 40769 | 4,7µF | 20% | 100V |
| 2837 | 4822 124 22726 | 4,7µF | 20% | 35V |
| 2838 | 4822 124 40248 | 10µF | 20% | 63V |
| 2839 | 4822 124 40433 | 47µF | 20% | 25V |
| 2840© | 4822 126 14585 | 100nF | 10% | 50V |
| 2841© | 4822 122 33216 | 270pF | 5% | 50V |
| 2842© | 4822 126 14238 | 2,2nF | 10% | 50V |
| 2843© | 4822 126 14585 | 100nF | 10% | 50V |
| 2844© | 4822 122 33216 | 270pF | 5% | 50V |
| 2848© | 4822 122 33753 | 150pF | 5% | 50V |
| 2860© | 4822 126 14494 | 22nF | 10% | 25V |
| 2861 | 4822 124 11947 | 10µF | 20% | 16V |
| 2862© | 4822 126 13883 | 220pF | 5% | 50V |
| 2863© | 4822 126 13883 | 220pF | 5% | 50V |
| 2865© | 5322 122 32654 | 22nF | 10% | 63V |
| 2866© | 4822 126 13751 | 47nF | 10% | 50V |

CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2867© | 4822 126 13883 | 220pF | 5% | 50V |
| 2868© | 2020 552 94427 | 100pF | 5% | 50V |
| 2869© | 2020 552 94427 | 100pF | 5% | 50V |
| 2872© | 3198 024 44730 | 47nF | 5% | 50V |
| 2873 | 4822 124 80231 | 47µF | 20% | 16V |
| 2876 | 4822 124 12245 | 220µF | 20% | 16V |
| 2877© | 4822 126 14226 | 82pF | | 50V |
| 2878© | 4822 126 13883 | 220pF | 5% | 50V |
| 2879 | 4822 124 12245 | 220µF | 20% | 16V |
| 2880 | 4822 124 11947 | 10µF | 20% | 16V |
| 2881 | 4822 124 40769 | 4,7µF | 20% | 100V |
| 2882© | 4822 126 13883 | 220pF | 5% | 50V |
| 2888 | 4822 124 11947 | 10µF | 20% | 16V |

RESISTORS

| | | | | |
|---|---|---|---|---|
| 3713© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3714© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3715© | 4822 117 13632 | 100kΩ | 1% | 0,06W |
| 3719© | 4822 051 30392 | 3,9kΩ | 5% | 0,06W |
| 3723© | 4822 051 20273 | 27kΩ | 5% | 0,1W |
| 3730© | 4822 051 20333 | 33kΩ | 5% | 0,1W |
| 3736© | 4822 117 12925 | 47kΩ | 1% | 0,06W |
| 3738© | 4822 051 30271 | 270Ω | 5% | 0,06W |
| 3740© | 4822 051 20223 | 22kΩ | 5% | 0,1W |
| 3741© | 4822 051 20223 | 22kΩ | 5% | 0,1W |
| 3742© | 4822 051 20223 | 22kΩ | 5% | 0,1W |
| 3743© | 4822 051 20223 | 22kΩ | 5% | 0,1W |
| 3744© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3745© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3746© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3747© | 4822 117 12925 | 47kΩ | 1% | 0,06W |
| 3748© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3750© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3751© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3752© | 4822 117 13632 | 100kΩ | 1% | 0,06W |
| 3753© | 4822 117 13632 | 100kΩ | 1% | 0,06W |
| 3754© | 4822 051 30221 | 220Ω | 5% | 0,06W |
| 3755© | 4822 117 11503 | 220Ω | 5% | 0,1W |
| 3757© | 4822 117 11373 | 100Ω | 1% | 0,1W |
| 3758© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3760© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3761© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3762© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3763© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3764© | 4822 117 11373 | 100Ω | 1% | 0,1W |
| 3765© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3766© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3767© | 4822 051 30339 | 33Ω | 5% | 0,06W |
| 3769© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3770© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3771© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3772© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3773© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3774© | 4822 117 11373 | 100Ω | 1% | 0,1W |
| 3775▲ | 4822 052 10338 | 3,3Ω | 5% | NFR25 |
| 3776© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3800© | 4822 051 30273 | 27kΩ | 5% | 0,06W |
| 3801© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3802© | 4822 051 30273 | 27kΩ | 5% | 0,06W |
| 3803© | 4822 117 10833 | 10kΩ | 1% | 0,1W |
| 3805© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3806© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3807© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3808© | 4822 051 30103 | 10kΩ | 5% | 0,06W |

## *ELECTRICAL PARTSLIST 3CDC-LC MODULE*

### RESISTORS

| | | | | |
|---|---|---|---|---|
| 3810© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3811© | 4822 051 30273 | 27kΩ | 5% | 0,06W |
| 3812© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3813© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3814© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3815▲ | 4822 052 10478 | 4,7Ω | 5% | NFR25 |
| 3816© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3817© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3818© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3819© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3820© | 4822 051 30332 | 3,3kΩ | 5% | 0,06W |
| 3821© | 4822 051 30332 | 3,3kΩ | 5% | 0,06W |
| 3822© | 4822 051 20332 | 3,3kΩ | 5% | 0,1W |
| 3823© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3824© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3825© | 4822 051 10102 | 1kΩ | 2% | 0,25W |
| 3826© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3827© | 4822 051 20273 | 27kΩ | 5% | 0,1W |
| 3829© | 4822 117 13608 | 4,7Ω | 5% | 0,06W |
| 3830© | 4822 051 20223 | 22kΩ | 5% | 0,1W |
| 3833© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3834© | 4822 051 30223 | 22kΩ | 5% | 0,06W |
| 3835▲ | 4822 052 10338 | 3,3Ω | 5% | NFR25 |
| 3836© | 4822 117 12903 | 1,8kΩ | 1% | 0,06W |
| 3837© | 4822 051 10102 | 1kΩ | 2% | 0,25W |
| 3838© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3839© | 4822 117 13632 | 100kΩ | 1% | 0,06W |
| 3840© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3842© | 4822 117 10834 | 47kΩ | 1% | 0,1W |
| 3843© | 4822 051 20333 | 33kΩ | 5% | 0,1W |
| 3844© | 4822 051 30472 | 4,7kΩ | 5% | 0,06W |
| 3845© | 4822 117 10834 | 47kΩ | 1% | 0,1W |
| 3846© | 4822 051 20333 | 33kΩ | 5% | 0,1W |
| 3847© | 4822 051 30682 | 6,8kΩ | 5% | 0,06W |
| 3848© | 3198 021 52240 | 220kΩ | 5% | 0,1W |
| 3849© | 4822 051 30472 | 4,7kΩ | 5% | 0,06W |
| 3850© | 4822 051 30682 | 6,8kΩ | 5% | 0,06W |
| 3853© | 4822 051 20471 | 470Ω | 5% | 0,1W |
| 3854© | 4822 117 11373 | 100Ω | 1% | 0,1W |
| 3855© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3856© | 4822 117 12521 | 68Ω | 1% | 0,1W |
| 3857© | 4822 117 12521 | 68Ω | 1% | 0,1W |
| 3861© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3862© | 4822 051 20121 | 120Ω | 5% | 0,1W |
| 3863© | 4822 051 30339 | 33Ω | 5% | 0,06W |
| 3864© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3865© | 4822 051 30121 | 120Ω | 5% | 0,06W |
| 3866© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3871© | 4822 051 20683 | 68kΩ | 5% | 0,1W |
| 3872© | 4822 051 30472 | 4,7kΩ | 5% | 0,06W |
| 3878© | 4822 117 11503 | 220Ω | 5% | 0,1W |
| 3880▲ | 4822 052 10338 | 3,3Ω | 5% | NFR25 |
| 3881© | 4822 117 11503 | 220Ω | 5% | 0,1W |
| 3882© | 4822 117 10837 | 100kΩ | 1% | 0,1W |
| 3883© | 4822 051 10102 | 1kΩ | 2% | 0,25W |
| 3890© | 4822 051 30332 | 3,3kΩ | 5% | 0,06W |
| 3891© | 4822 051 30472 | 4,7kΩ | 5% | 0,06W |
| 4700© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4701© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4702© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4703© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4704© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4705© | 4822 051 20008 | CHIP JUMPER 0805 | | |
| 4706© | 4822 051 20008 | CHIP JUMPER 0805 | | |

### RESISTORS

| | | |
|---|---|---|
| 4707© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4708© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4709© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4710© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4711© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4712© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4713© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4714© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4715© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4716© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4717© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4718© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4719© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4720© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4722© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4724© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4726© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4727© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4728© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4729© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4730© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4731© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4732© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4733© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4734© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4735© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4736© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4737© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4738© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4739© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4740© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4741© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4742© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4743© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4744© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4745© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4746© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4747© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4748© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4749© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4801© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4804© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4806© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4807© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4808© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4809© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4810© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4811© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4820© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4823© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4824© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4825© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4826© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4828© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4829© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4830© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4831© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4832© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4833© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4834© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4837© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4838© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4839© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4840© | 4822 051 20008 | CHIP JUMPER 0805 |

## *ELECTRICAL PARTSLIST 3CDC-LC MODULE*

### RESISTORS

| | | |
|---|---|---|
| 4841© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4842© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4844© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4845© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4846© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4847© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4848© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4849© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4851© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4855© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4856© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4857© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4858© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4868© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4869© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4870© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4871© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4872© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4873© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4874© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4875© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4876© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4878© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4879© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4880© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4882© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4883© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4884© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4885© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4886© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4887© | 4822 051 30008 | CHIP JUMPER 0603 |
| 4888© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4889© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4890© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4891© | 4822 051 30008 | CHIP JUMPER 0603 |

### RESISTORS

| | | |
|---|---|---|
| 4892© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4893© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4894© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4895© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4896© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4897© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4898© | 4822 051 20008 | CHIP JUMPER 0805 |
| 4899© | 4822 051 20008 | CHIP JUMPER 0805 |

### COILS

| | | |
|---|---|---|
| 1810 | 2422 540 98519 | RESONATOR 8,467MHz |

### DIODES

| | | |
|---|---|---|
| 6801© | 4822 130 11397 | BAS316 |
| 6802© | 4822 130 11397 | BAS316 |
| 6803© | 4822 130 11397 | BAS316 |
| 6804© | 4822 130 11397 | BAS316 |
| 6805© | 9340 548 52115 | BZX284-C5V1 |
| 6807© | 9322 129 34685 | BZX284-C3V9 |
| 6808© | 4822 130 11397 | BAS316 |
| 6809© | 9322 129 34685 | BZX284-C3V9 |

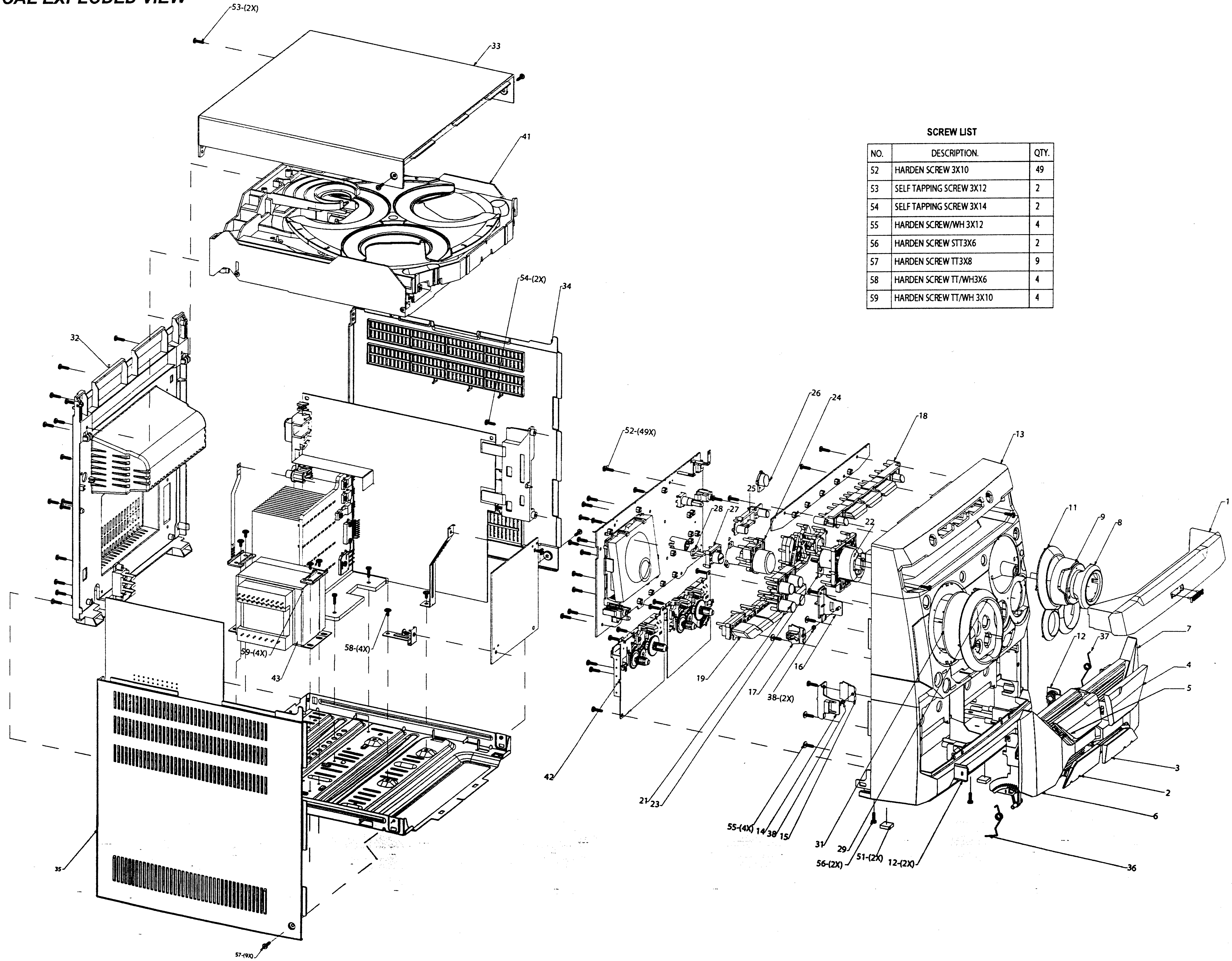
### TRANSISTORS

| | | |
|---|---|---|
| 7806© | 5322 130 60159 | BC846B |
| 7812© | 5322 130 60159 | BC846B |
| 7815© | 5322 130 60159 | BC846B |

### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7801© | 9352 622 36118 | TZA1025T/V2 HF-Amplifier |
| 7802© | 9352 641 80557 | SAA7324H/M2B,"CD10" SIGN.PROC. |
| 7803 | 4822 209 32852 | TDA7073A/N2 |
| 7807 | 4822 209 32852 | TDA7073A/N2 |
| 7811© | 4822 209 33165 | TDA1308T/N1 |
| 7813© | 5322 209 11306 | HEF4094BT, SHIFT REGISTER |
| 7814 | 4822 209 32852 | TDA7073A/N2 |

# MECHANICAL EXPLODED VIEW


53-(2X)
33
41
54-(2X)
34
32
52-(49X)
26
24
18
13
25
28
27
22
11
9
8
1
7
12
37
4
5
3
2
6
36
59-(4X)
43
58-(4X)
42
19
17
38-(2X)
16
21
23
55-(4X)
14
38
15
31
29
56-(2X)
51-(2X)
12-(2X)
35
57-(9X)

**SCREW LIST**

| NO. | DESCRIPTION. | QTY. |
|---|---|---|
| 52 | HARDEN SCREW 3X10 | 49 |
| 53 | SELF TAPPING SCREW 3X12 | 2 |
| 54 | SELF TAPPING SCREW 3X14 | 2 |
| 55 | HARDEN SCREW/WH 3X12 | 4 |
| 56 | HARDEN SCREW STT3X6 | 2 |
| 57 | HARDEN SCREW TT3X8 | 9 |
| 58 | HARDEN SCREW TT/WH3X6 | 4 |
| 59 | HARDEN SCREW TT/WH 3X10 | 4 |

## ELECTRICAL PARTSLIST MP3CD2002 MODULE

### MISCELLANEOUS

| | | |
|---|---|---|
| | **3103 308 67020** | **complete MP3CD2002 Module** |
| 1451 | 2422 025 17303 | FLEX FOIL CONNECTOR 19P |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2450© | 2238 586 59812 | 100nF | 10% | 50V |
| 2451© | 3198 017 41050 | 1µF | 20% | 10V |
| 2452© | 3198 017 41050 | 1µF | 20% | 10V |
| 2453© | 2238 586 59812 | 100nF | 10% | 50V |
| 2454© | 2238 586 59812 | 100nF | 10% | 50V |
| 2455© | 2238 586 59812 | 100nF | 10% | 50V |
| 2456© | 2238 586 59812 | 100nF | 10% | 50V |
| 2457© | 5322 126 11583 | 10nF | 10% | 63V |
| 2458© | 5322 126 11583 | 10nF | 10% | 63V |
| 2459© | 3198 017 41050 | 1µF | 20% | 10V |
| 2460© | 2238 586 59812 | 100nF | 10% | 50V |
| 2461© | 4822 124 81059 | 220µF | 20% | 4V |
| 2462© | 3198 017 41050 | 1µF | 20% | 10V |
| 2463© | 3198 017 41050 | 1µF | 20% | 10V |
| 2464© | 2238 586 59812 | 100nF | 10% | 50V |
| 2465© | 2238 586 59812 | 100nF | 10% | 50V |
| 2466© | 2238 586 59812 | 100nF | 10% | 50V |
| 2467© | 3198 017 41050 | 1µF | 20% | 10V |
| 2468© | 3198 017 41050 | 1µF | 20% | 10V |
| 2469© | 2238 586 59812 | 100nF | 10% | 50V |
| 2470© | 2238 586 59812 | 100nF | 10% | 50V |
| 2471© | 2238 586 59812 | 100nF | 10% | 50V |

### RESISTORS

| | | | | |
|---|---|---|---|---|
| 3449© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3450© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3451© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3452© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3453© | 4822 051 30109 | 10Ω | 5% | 0,06W |
| 3454© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3455© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3456© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3457© | 5322 117 13051 | 680Ω | 1% | 0,063W |
| 3458© | 5322 117 13061 | 180Ω | 1% | 0,063W |
| 3459© | 4822 051 30221 | 220Ω | 5% | 0,06W |
| 3460© | 4822 051 30102 | 1kΩ | 5% | 0,06W |
| 3461© | 4822 051 30479 | 47Ω | 5% | 0,06W |
| 3462© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3463© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3464© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3465© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3466© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3467© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3468© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3469© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3470© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3471© | 4822 051 30339 | 33Ω | 5% | 0,06W |
| 3472© | 4822 051 30154 | 150kΩ | 5% | 0,06W |
| 3473© | 4822 117 13632 | 100kΩ | 1% | 0,06W |

### RESISTORS

| | | | | |
|---|---|---|---|---|
| 3474© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3475© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3476© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3477© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3478© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3479© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3480© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3481© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3482© | 4822 051 30471 | 470Ω | 5% | 0,06W |
| 3483© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3484© | 4822 117 12971 | 15Ω | 5% | 0,06W |
| 3486© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3488© | 4822 117 13632 | 100kΩ | 1% | 0,06W |
| 3489© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3490© | 4822 051 30101 | 100Ω | 5% | 0,06W |
| 3491© | 4822 051 30479 | 47Ω | 5% | 0,06W |
| 3492© | 4822 051 30105 | 1MΩ | 5% | 0,06W |
| 3493© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3494© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3495© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3497© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 3498© | 4822 051 30332 | 3,3kΩ | 5% | 0,06W |
| 3499© | 4822 051 30103 | 10kΩ | 5% | 0,06W |
| 4450© | 4822 051 30008 | CHIP JUMPER 0603 | | |

### COILS

| | | |
|---|---|---|
| 1460 | 4822 242 10989 | CER.RES. 16,9MHz |
| 5450© | 4822 157 11074 | 100µH |

### DIODES

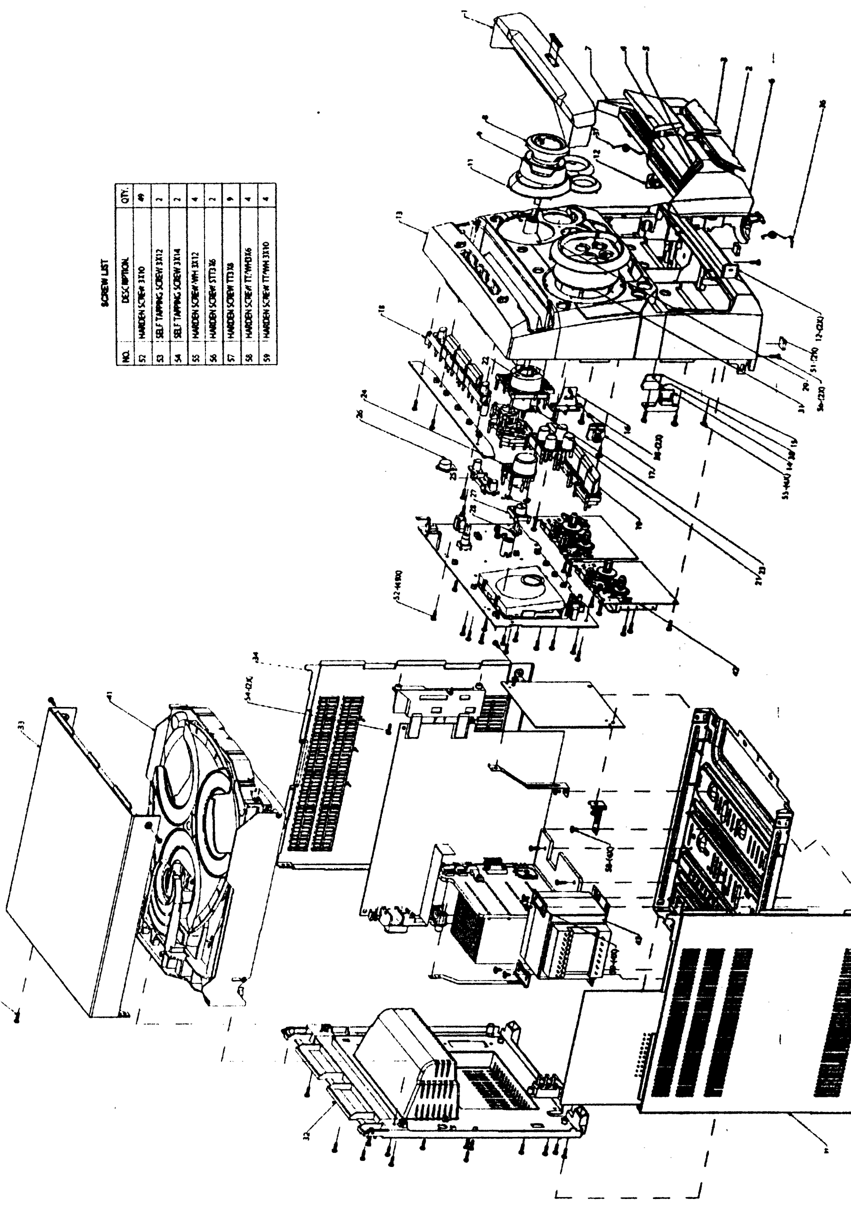
| | | |
|---|---|---|
| 6450© | 4822 130 11411 | BZX284-C3V3 |
| 6451© | 4822 130 11366 | BZX284-C3V9 |
| 7454 | 4822 130 34174 | BZX79-B4V7 |

### TRANSISTORS

| | | |
|---|---|---|
| 7452© | 3198 010 42310 | BC847BW |
| 7453© | 3198 010 42310 | BC847BW |
| 7456© | 3198 010 42310 | BC847BW |
| 7460© | 3198 010 42310 | BC847BW |

### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7450© | **not available** | **please order complete MP3 module** |
| 7451© | **not available** | **please order complete MP3 module** |
| 7455© | 4822 209 17108 | LM317LD Voltage Regulator |
| 7457© | 9352 456 50115 | HC1G04, Inverter |
| 7458© | 9322 130 41668 | M24C64, EEPROM |
| | **3103 308 67020** | **complete MP3CD2002 Module** |



SCREW LIST

| NO. | DESCRIPTION. | QTY. |
|---|---|---|
| 52 | HARDEN SCREW 3X10 | 49 |
| 53 | SELF TAPPING SCREW 3X12 | 2 |
| 54 | SELF TAPPING SCREW 3X14 | 2 |
| 55 | HARDEN SCREW WH 3X12 | 4 |
| 56 | HARDEN SCREW STT3X6 | 2 |
| 57 | HARDEN SCREW TT3X6 | 9 |
| 58 | HARDEN SCREW TT/WH3X6 | 4 |
| 59 | HARDEN SCREW TT/WH 3X10 | 4 |

MECHANICAL EXPLODED VIEW

## MECHANICAL & ACCESSORIES

| | | |
|---|---|---|
| 1 | 9940 000 01275 | CDC TRAY DOOR /22 |
| 1 | 9940 000 01331 | CDC TRAY DOOR /21/30 |
| 2 | 9940 000 01292 | CASS LENS BOTTOM L |
| 3 | 9940 000 01291 | CASS LENS BOTTOM R |
| 4 | 9940 000 01288 | CASS RIGHT TOP LENS |
| 5 | 9940 000 01289 | CASS LEFT TOP LENS |
| 6 | 9940 000 01287 | CASS BOX LEFT /21/22 |
| 6 | 9940 000 01338 | CASS BOX LEFT /30 |
| 7 | 9940 000 01286 | CASS BOX RIGHT /21/22 |
| 7 | 9940 000 01337 | CASS BOX RIGHT /30 |
| 8 | 9940 000 01297 | VOL KNOB GRIP |
| 9 | 9940 000 01296 | VOL KNOB RING |
| 11 | 9940 000 01281 | COSMETIC RING |
| 12 | 9940 000 01295 | DAMPER GEAR ASS'Y |
| 13 | 9940 000 01278 | FRONT CAB /22 |
| 13 | 9940 000 01332 | FRONT CAB /21 |
| 13 | 9940 000 01336 | FRONT CAB /30 |
| 14 | 9940 000 01284 | LEFT-BRACKET |
| 15 | 9940 000 01294 | PUSH CATCH LEFT |
| 16 | 9940 000 01283 | RIGHT-BRACKET |
| 17 | 9940 000 01293 | PUSH CATCH |
| 18 | 9940 000 01305 | CD DISC KEYS |
| 19 | 9940 000 01306 | MODEL KEY |
| 21 | 9940 000 01301 | SOURCE KEYS |
| 22 | 9940 000 01299 | CD CONTROL KEY |
| 23 | 9940 000 01298 | CD PLAY KEY |
| 24 | 9940 000 01303 | DBB KNOB |
| 25 | 9940 000 01302 | AUTO KEYS |
| 26 | 9940 000 01309 | IR LENS |
| 27 | 9940 000 01304 | STANDBY KEY |
| 28 | 9940 000 01307 | STANDBY LENS |
| 29 | 9940 000 01282 | DISPLAY RING |
| 31 | 9940 000 01308 | DISPLAY LENS |
| 32 | 9940 000 01279 | REAR PANEL |
| 33 | 9940 000 01285 | TOP COVER |
| 34 | 9940 000 01277 | PANEL RIGHT |
| 35 | 9940 000 01276 | PANEL LEFT |
| 36 | 9940 000 01266 | SPRING -LEFT |
| 37 | 9940 000 01267 | SPRING -RIGHT |
| 38 | 9940 000 01268 | SPRING COMPRESSION |
| 39 | 9940 000 01264 | FOOT RUBBER 4MM |
| 41 | 9940 000 01269 | 3CD MECH CASING ASS'Y |
| 42 | 9940 000 01271 | LOGIC DECK W991D-5168 |
| 43 | 9940 000 01333 | MIC KNOB /21 |
| | 9940 000 01189 | REMOTE CONTROL FWM35 |
| | 9940 000 01191 | SPK BOX L R 30W 6R |
| | 9940 000 01192 | AM LOOP ANTENNA LAN-031 |
| | 9940 000 01381 | FM ANTENNA |
| | 9940 000 01253 | PCBAS ETF7-FERRO |
| | ⚠ 9940 000 01263 | AC CORD 1.9M /22 |
| | ⚠ 9940 000 01329 | AC CORD VDE APP 1.83M /21 |
| | ⚠ 9940 000 01334 | AC CORD SAA APP 2M /30 |
| | 9940 000 01272 | MP3 BD ASS'Y (ROM TXT 5V) |
| | 9940 000 01273 | CD BD ASS'Y |
| | 9940 000 01274 | CD DRIVER(SANYO) |
| | 9940 000 01327 | AC CORD BUSHING /21 |

**Note: Only these parts mentioned in the list are normal service parts.**

## ELECTRICAL PARTS - MISCELLANEOUS

| | |
|---|---|
| ⚠ 9940 000 01254 | TRANSFORMER 230V /22 |
| ⚠ 9940 000 01326 | TRANSFORMER 127-240V /21 |
| ⚠ 9940 000 01341 | TRANSFORMER 240V /30 |
| 9940 000 01255 | 15P FFC 1.25MM L=180MM |
| 9940 000 01256 | 4P FFC 1.25MM L=220MM |
| 9940 000 01257 | 11P FFC 1.25MM L=260MM |
| 9940 000 01258 | 6P FFC 1.25MM L=280MM |
| 9940 000 01259 | 6P FFC 1.25MM L=280MM |
| 9940 000 01261 | 7P FFC 1.25MM L=280MM |
| 9940 000 01262 | 19P FFC 1.25MM L=280MM |
| 9940 000 01328 | 19P FFC 1MM L=180MM /21 |
| 9940 000 01335 | 7P FFC 1.25MM L=220MM /30 |
| 9940 000 01504 | FRONT BOARD ASS'Y /22 |
| 9940 000 01506 | MAIN BOARD ASS'Y /22 |
| 9940 000 01507 | POWER BOARD ASS'Y /22 |
| 9940 000 01508 | CASS DECK BOARD ASS'Y /22 |

**Note: Only these parts mentioned in the list are normal service parts.**